December, 1943

THE FOUNDRY

FIFTY-SECOND YEAR

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Ohio Ferro-Alloys Corporation
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THE DEMAND FOR CASTINGS TURNS

night INTO day

Castings are required to give life and purpose to the armaments of modern war. When foundries shut down, tanks and bombers freeze on the assembly lines . . . ships sit motionless on the ways. That's why foundrymen now work night and day.

Purite, the scientific flux, is an invaluable aid in the delivery of maximum output of sound, tough gray iron and converter steel castings. In the cupola Purite prevents oxidation and reduces sulfur pick-up by the metal . . . in the ladle it removes sulfur as required to meet specifications. In both applications Purite refines the iron . . . that means stronger, cleaner castings and fewer "rejects."

Purite speeds production . . . lowers costs. Write for Mathieson Bulletin P-41 describing the different uses of Purite.

Purite

ARMY E NAVY

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42ND STREET, NEW YORK, N. Y.
(Licensee of Metallurgical Development Company, Inc.)

SODA ASH IN ITS MOST EFFICIENT FORM FOR METALLURGICAL PURPOSES

New GAS SCHOOL trains workers to fight industrial gases

Every day a large steel plant produces millions of cubic feet of dangerous gases — blast-furnace gas, coke-oven gas, carbon monoxide, ammonia gas, and the like. Now, with thousands of new workers, protection against the gas hazard is more important than ever before.

To safeguard workers more fully, Bethlehem is now operating what is believed to be the first and only industrial gas school in any American steel plant.

Climax of the course comes when each man performs physical work while wearing gas-protective equipment in a gas-tight room filled with white clouds of non-poisonous but choking, stinging gas.

But before any man goes into the gas chamber he receives a thorough training in gas-fighting technique. He learns:

1. How to use and maintain various types of masks and breathing apparatus.
2. How to choose the proper equipment for a given gas.
3. Which industrial gases are dangerous and where they are likely to be found.
4. How those gases affect the body.
5. How to revive a victim who has been gassed.

Then the trainees are ready for the test. They strap on a canister mask, "fresh-air" mask, or oxygen-breathing apparatus, and step into the gas-filled room. They crawl through tunnels on mock rescues, climb over hurdles, load wheelbarrows, repair pipes, and do many other kinds of simple, every-day tasks, to accustom themselves to the strange sensation of physical exertion while breathing through protective equipment. The gas in the chamber is not dangerous, but highly unpleasant, so that if a man decides not to bother with his mask and slips it off, one whiff will send him out of the chamber choking and wiping his eyes.

● Men at work in gas-filled room, in Bethlehem gas school. The instructor watches through a window, directs their efforts over a public-address system. Gas used is unpleasant but not harmful. This test trains men to meet emergencies and accustoms them to breathing through protective equipment.

Men from all departments who may have to cope with industrial gas are given this training; men from blast furnaces and coke works; men from labor and construction, combustion, fire and police departments. Men who normally work together on the job are trained in teams so that they can go into action as a unit in an emergency.

The school is a marked success. Men are rapidly learning to combat dangerous industrial gases, to use the proper protective equipment and, when necessary, to work safely and easily in gaseous atmospheres. Safeguarding of workers against industrial gases is one of many ways in which Bethlehem's work in safety promotion is helping to maintain output at record-breaking levels. Whatever contributes to the health and the safety of workers helps to increase the flow of weapons and supplies to our fighters overseas.

★ BETHLEHEM STEEL ★

TRADEMARK of a Quality SEACOAL

CROWN HILL Seacoal Facing is a new and better seacoal, made to do a better job in today's foundries. It is designed to help solve your production problems.

CROWN HILL is made from the best coal, pulverized on the most modern machinery, in a new plant designed exclusively for that purpose.

CROWN HILL is as good as 35 years' experience can make it! Try it in your foundry—now.

THE FEDERAL FOUNDRY SUPPLY COMPANY

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THE FOUNDRY

for DECEMBER 1943

VOLUME 71 NUMBER 12

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10 TONS

VULCAN IRON WORKS

WILKES-BARRE PENNSYLVANIA

For tip-top core results keep all factors uniform. Inspect all core sand closely for uniformity of grain size and sharpness, and for freedom from dirt. Watch the tempering, especially sand arriving in open cars in snowy or rainy weather. It is highly important that the moisture content of core sand be uniform when used. Temperature is important—do not use too cold sand or oil. Work your ratio of oil down as low as possible, and measure quantities of sand and oil exactly. Mull or mix thoroughly and for uniform lengths of time. Check your ovens for ventilation, heat circulation, and temperature in all parts. Watch drying time and temperature. Handle hot cores gently. These things all pay dividends.

"Why do we use Linoil?" says Dan A. Sutch, Superintendent of the Vulcan Iron Works, "I believe that the plainest statement of fact that could be made would be that in jobs such as this we would not think of using any material but what we consider the best."

THE WERNER G.

(DIVISION OF ARCHER-

2191 WEST 110 STREET WOODBINE

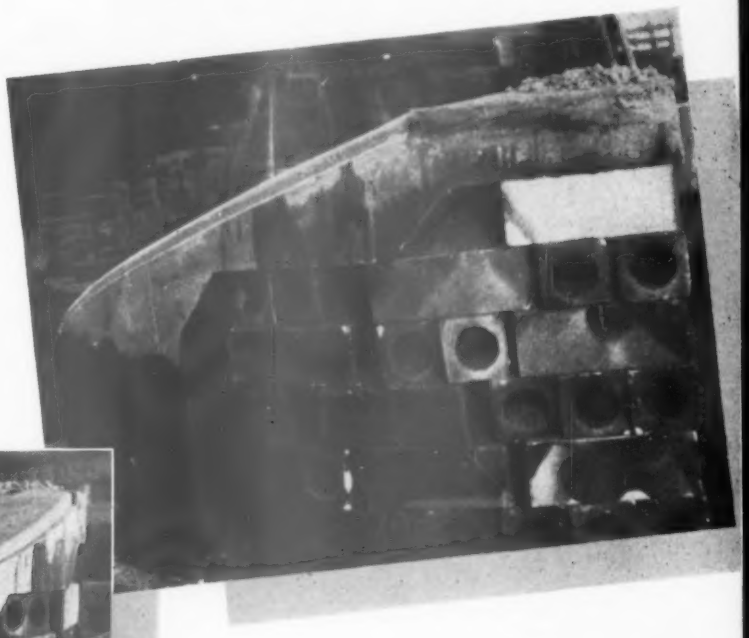
OF CAST STEEL

MADE IN TWELVE 2400 POUND CORES

This 20,000 pounder isn't going to drop on the Reich from the air but it is going to hurt Hitler more where it is going. It is in a gondola car bound for a hot spot on the home front. It is a 6-blade hydro-electric runner and it measures 11 feet in diameter. The way the mold is assembled is interesting. It takes twelve 2400-pound sections, note method of supporting for drying. The twelve sections are made with Linoil, 1-80 ratio.

LINOIL

Vulcan Iron Works is only one of a large number of steel foundries doing all their heavy work in Linoil dry sand molds. They find the Linoil cores take the extreme heat these jobs require, allow the metal to lie quietly, give a finish to the castings not usually attained in green sand, permit of much closer molding to dimensions than with black sand, and simplify the cleaning.



When you pour ten tons of metal into one mold it is a very comfortable feeling to know the cores and mold are going to behave according to Hoyle. You are glad then that you didn't save that $1.25 on binder but played safe on Linoil. Linoil has never fooled a foundryman—not in 25 years—not in many million gallons.

SMITH COMPANY

DANIELS - MIDLAND COMPANY)

4690 CLEVELAND, OHIO 2

ROTOBLAST

INSIDE FACTS

ROTOBLAST AIRLESS CLEANING UNIT

Behind this section a centrifugal wheel throws abrasive against work to be cleaned in drum below.

DRUM FOR TURNING WORK

Behind dust-tight housing a drum holding work rocks back and forth under blast area, cleaning load quickly.

DUST-TIGHT DOOR FOR LOADING AND UNLOADING

The large dust-tight, counter-balanced door may be motor operated if desired.

LOADING SKIP

A simple, efficient, quick-working accessory to handle all types of work easily and economically.

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

PANGBORN CORPORATION . . . . . .

simplifies blast cleaning

MANY LABOR SAVING AND COST REDUCING ECONOMIES FEATURED IN PANGBORN BARRELS, TABLES AND CABINETS

★ Airless **ROTOBLASTING** — simplifying work in so many war plant cleaning departments today —multiplies blast cleaning speed many times over. The *reason why* lies in higher abrasive speed and impact, less delays and greater production possibilities when the **ROTOBLAST** unit is incorporated into Barrels, Tables and Cabinets adapted to fit your requirements.

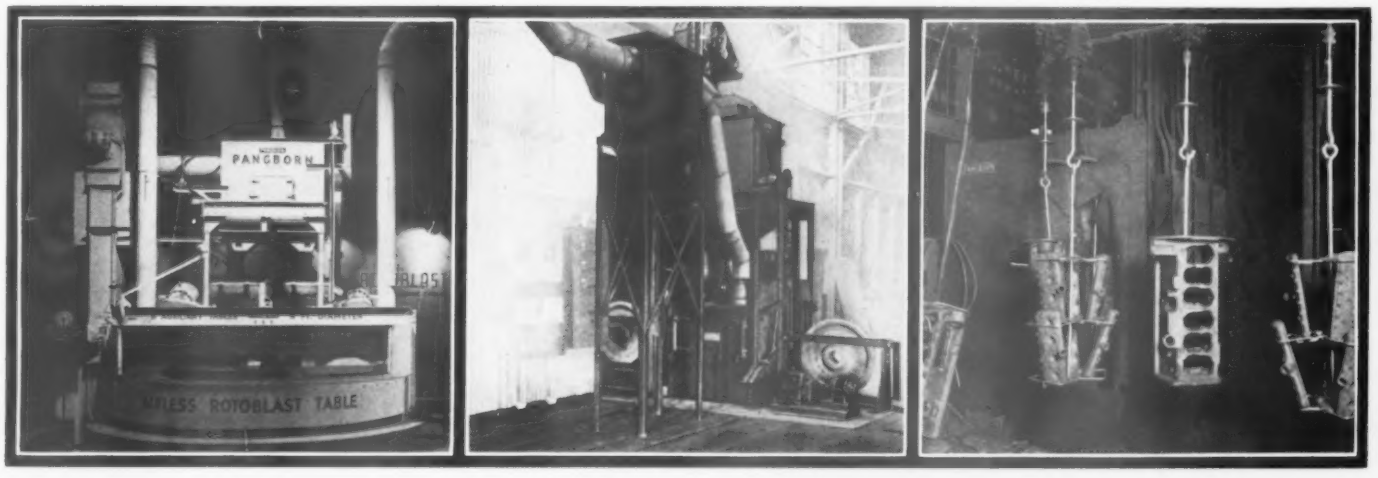
The Pangborn **ROTOBLAST** is designed to do a **BIG JOB** with *little* effort. This means a cleaning department reduced to one operator for two machines, with an unskilled laborer for help in loading and unloading. Gone is the high labor overhead with its uncertain human factor. Cleaning speed becomes regular, certain, predictable. Costs are down. Production is up.

ROTOBLASTED work is free from sand and scale. **ROTOBLASTED** work is easier to grind and machine. Therefore tools last longer. **ROTOBLASTED** work has fine uniform appearance.

For ECONOMY—SPEED—SATISFACTION—use **ROTOBLAST.**

OTHER ROTOBLAST MACHINES

TABLE **CABINET** **CABINET**



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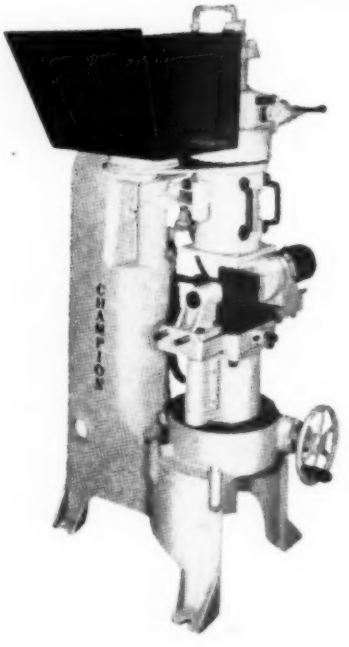
couldn't buy a better core blower

Champion
CORE BLOWER
CB-8



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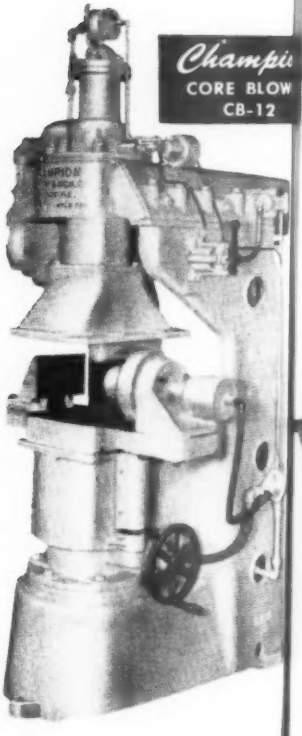

CHAMPION

When you buy a Champion Core Blower, you buy the best experience, ability, design, workmanship and performance. Produced by practical foundryman with a successful record of 47 years in making foundry equipment. Designed by engineers whose single aim is to develop the best core blowers available. Manufactured by men of wide foundry experience and mechanical knowledge. Guaranteed by one of the oldest names in the foundry equipment field.

That's why Champion Core Blowers deliver 25% more blow power. That's why any previously inexperienced man or woman can produce perfectly rammed cores the Champion way—small or large cores in a single second. That's why you couldn't buy a better core blower for $1,000,000.

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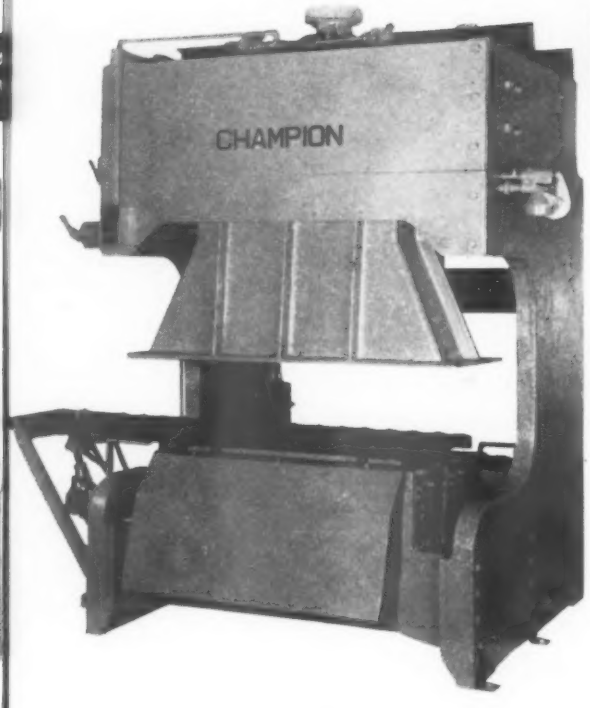

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CORE BLOWER
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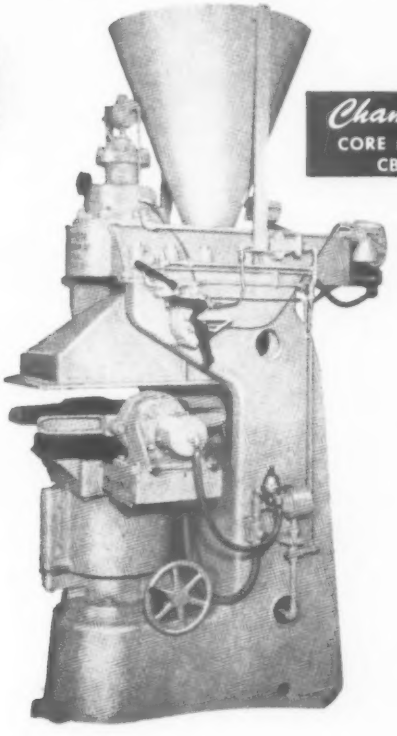


Champion
CORE BLOWER
CB-15

core blowers

Leading Foundries Everywhere

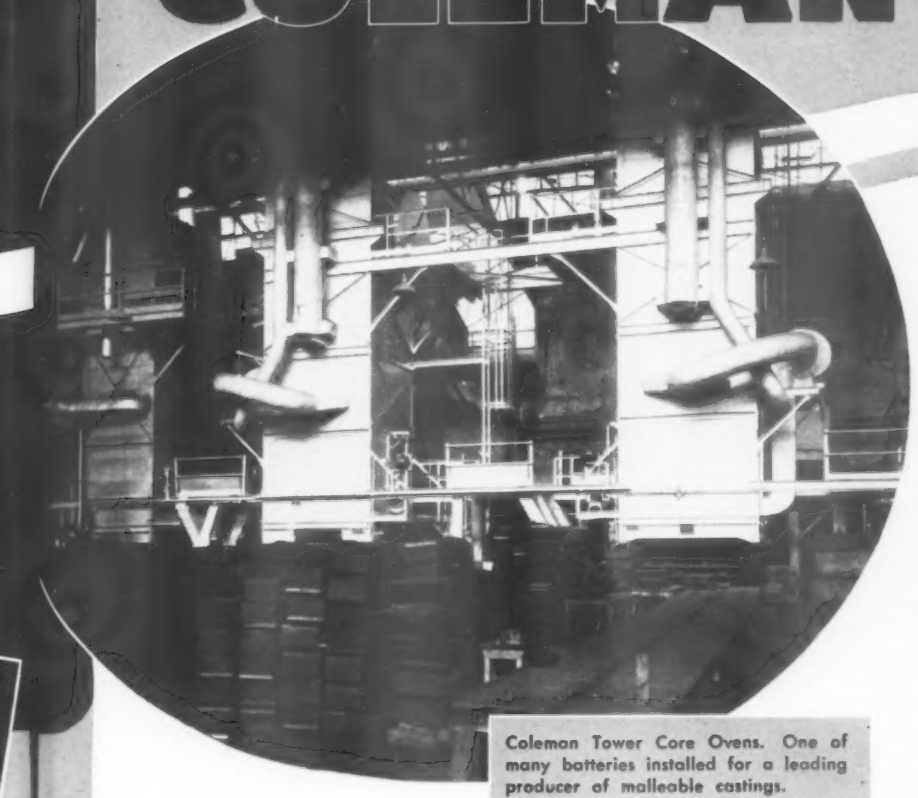
Part of large installation of Coleman Transrock Ovens in leading magnesium foundry.

One of many batteries of Coleman Car Type Ovens serving a leading producer of engines and compressors.

COLEMAN
CORE AND MOLD OVENS

THE FOUNDRY EQ
BUILDERS OF COLEMAN AND
CLEVELAND, OH

Repeatedly Choose COLEMAN Ovens!



Coleman Tower Core Ovens. One of many batteries installed for a leading producer of malleable castings.

The outstanding example is the installation of nearly 100 Coleman Ovens by a single leading producer of magnesium castings. In this new branch of the foundry industry as well as in the production of iron, steel, malleable, brass, aluminum and alloy castings, leading foundries have repeatedly selected Coleman Ovens on their performance record.

Built into every Coleman Oven is the experience gained through 40 years of specialization in the design and construction of fast, dependable and economical foundry ovens. And there's ample proof in the calibre of Coleman users and over 8,000 successful installations.

Furthermore, Coleman Engineering provides the most extensive line of foundry ovens built—your assurance of the right type and capacity for your particular job.

Why not have a Coleman Oven Engineer call and survey your operating conditions? No obligation.

• There is a right type and capacity of Coleman Oven to best suit your own requirements. Built for whatever fuel is most easily and economically obtainable in your district.

Write for Folio of Bulletins

COLEMAN Portable Ovens
COLEMAN Rolling Drawer Ovens
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Y EQUIPMENT CO.
N AND SWARTWOUT OVENS
D, OHIO, U.S.A.

COLEMAN CORE AND MOLD OVENS

it's something like mustard on your frankfurter

You can eat a frankfurter *plain* and get nourishment but a little mustard will put a "tang" into it and furnish that *plus* feature of enjoyment.

You can, of course, melt iron, too, without Famous CORNELL Cupola FLUX but many of the most outstanding foundrymen have found it so substantially beneficial that its use has become a *must.* With them it's as important as mint sauce with roast lamb, or yorkshire pudding with roast beef, or sauerkraut with spare ribs.

They get satisfaction in being able to point out definite and valuable advantages. They see a more active slag hole and realize that this means less slag, sulphur and impurities in the iron.

More important still, they see results in castings that are denser—more capable of withstanding high pressure—more easily machinable. There are tangible savings, too, in cost as compared to the use of limestone alone.

There are among the users of Famous CORNELL Cupola FLUX many foundrymen whose judgment and accomplishments you doubtless greatly respect. Let us tell you about them and explain in detail how you too can benefit by the use of this famous flux.

In the handy brick form. A brick to a ton—a briquette for each 500 pounds of metal. Fast, convenient, economical to use.

No trouble or inconvenience will be entailed as it comes in the handy brick form which is easy and economical to use. Write for literature and advise when our representative can call.

THE CLEVELAND FLUX COMPANY

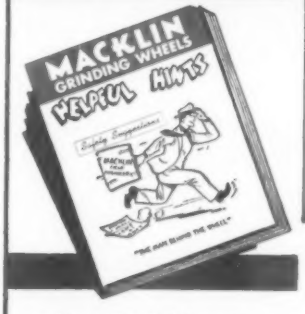
Manufacturers of Iron, Brass and Aluminum Fluxes Since 1918

1026-1030 Main Ave., N. W.

CLEVELAND, O.

MACKLIN

GRINDING WHEELS



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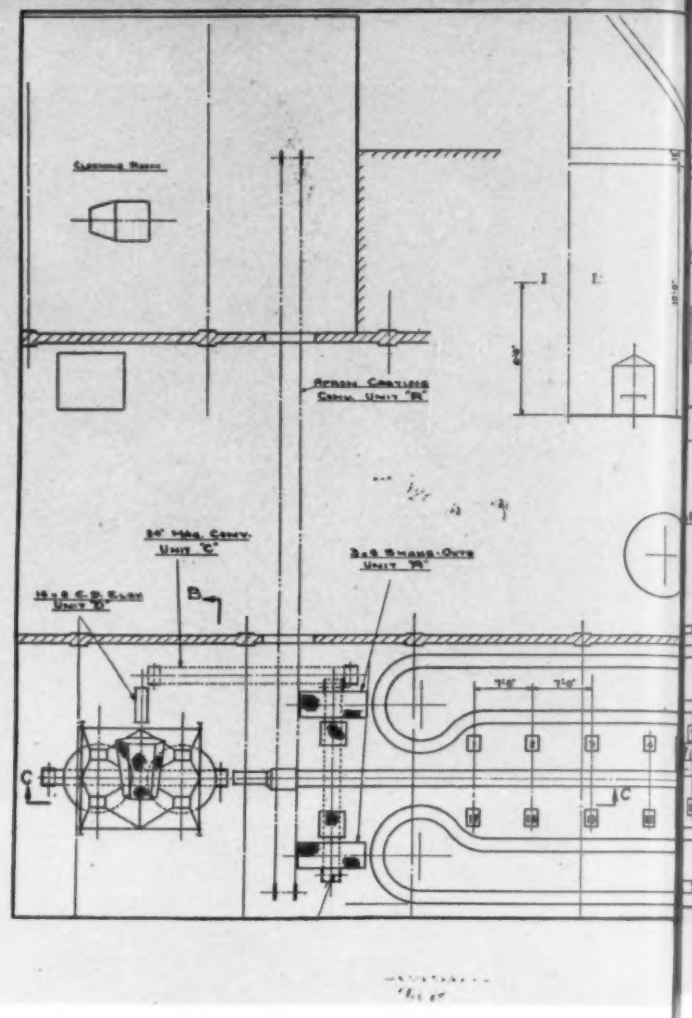
Complete Sand Systems FOR MALLEABLE FOUNDRIES



ENGINEERED BY

ONE of the major problems facing malleable foundries is that of producing, with an ever dwindling force of skilled labor, castings that meet today's rigid inspection. Yet, it is a problem that is being met and solved by many malleable foundries through the use of modern mechanical equipment and highly efficient production systems designed and built by National.

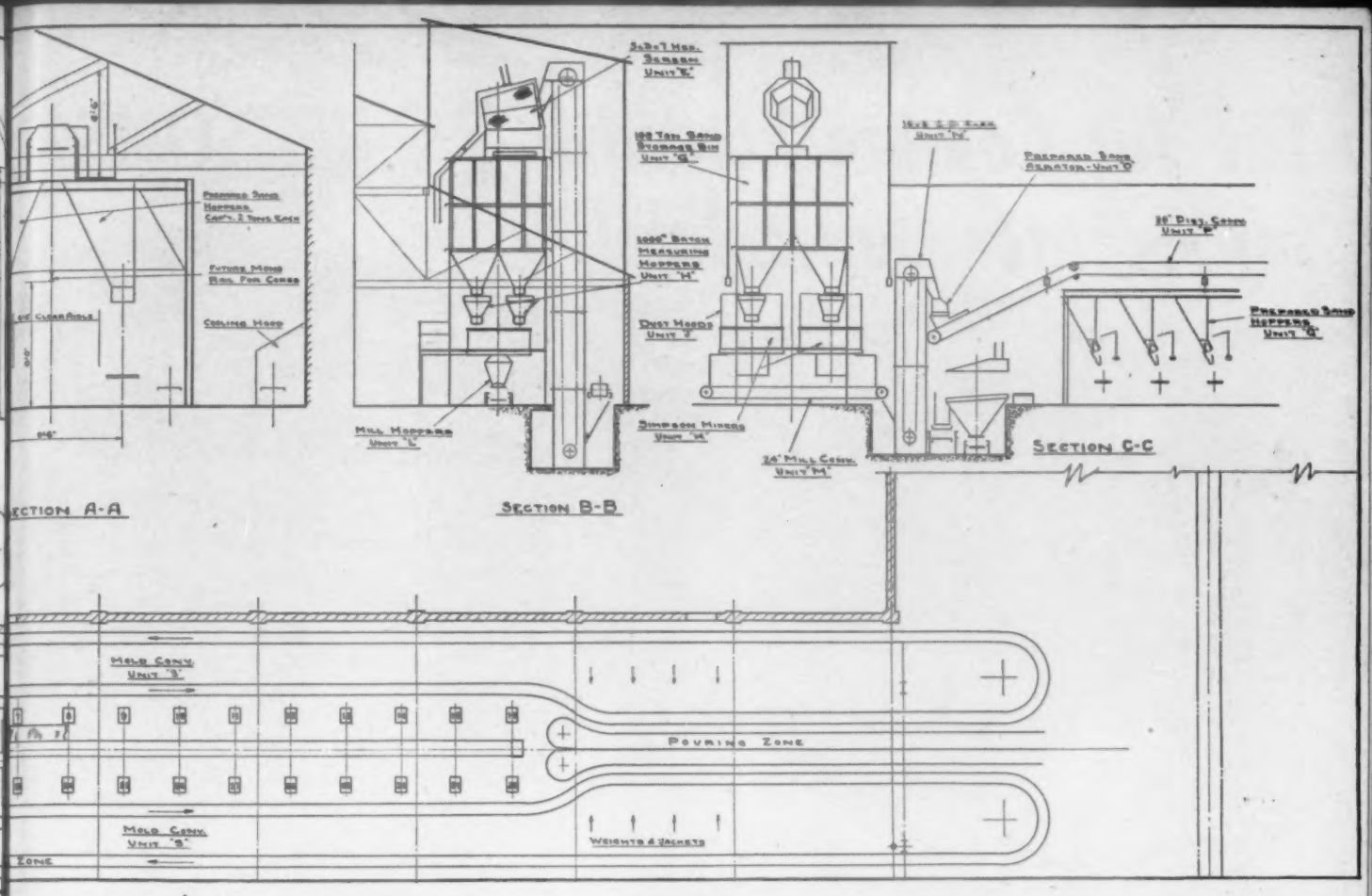
A good example of what National Engineering can do to insure properly prepared sand, with a minimum of skilled labor, is illustrated by the schematic drawing above. National, which has engineered approximately 90% of the sand systems at work in malleable foundries today, designed and installed this system to meet the special needs of a big producer of malleable castings.

National Engineering Company has played a vital role in the program to provide peak foundry production of war materials, with a limited force of skilled labor. In the last two years, National has furnished complete sand preparing, sand reclaiming, sand and mold handling units for more than 50 major foundries for production of malleable, aluminum, magnesium, steel, heavy grey iron and non-ferrous castings. National Systems guarantee a maximum of properly prepared sand at lowest net cost per ton.

It will profit you to investigate the advantages of complete sand systems engineered by National. A National engineer will gladly help you. Call him in.

● This No. 3 Simpson Intensive Mixer is one of 10 sizes available to meet every mixing requirement. During the past two years more than 1000 Simpson Mixers have been installed in foundries of all types, to provide properly mulled sand for production of castings for war.

ARMY E NAVY



National MEANS...

- High Quality Castings
- Lower Cost
- Peak Production
- Better Finishes
- Sand Control
- A Minimum of Skilled Labor

National Engineering Service **National Field Service**

For more than 30 years National Engineering and Field Service has helped hundreds of foundries solve problems in sand preparation, reclamation, handling, storage and control. Today, National Engineers are constantly on the job helping foundries with problems of sand handling and control on construction, maintenance, repair or new requirements. National Engineering and Field Service is available and eager to help you whenever and wherever you need it.

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries: —The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia — August's Limited, Halifax, England. For Canada — Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

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"INDUSTRIAL-AIR"
24 Hour a Day
Heavy Duty Service
For Foundry, Factory, Mill and Plant of Small and Medium Size —For Special Service in Largest Plants
25 Reasons for "INDUSTRIAL-AIR" Dependability

● The heavy-duty, Vertical "Industrial-Air" for smaller plants—or for special or auxiliary services in large plants—embodies most modern advances in design and manufacture, and sets new standards of performance. It is the *only* single-stage, double acting compressor that provides:

Full force feed lubrication to all working parts, replaceable cylinder liners and crosshead guides, anti-friction main bearings, Sullivan's own exclusive long-life "Dual-Cushion" Valves and greater capacity per foot of floor space. Eleven different sizes with displacements from 153 to 822 C.F.M. and pressures from 30 to 150 lbs.

It has 25 outstanding features of construction... features of dependability... features you should know... features told at length in Catalog A-43. Write your nearest Sullivan branch office *today.* SULLIVAN MACHINERY COMPANY, Michigan City, Indiana. *In Canada:* Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.

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STATIONARY AND PORTABLE AIR COMPRESSORS FROM ¼ TO 3000 H. P., PNEUMATIC CASTING GRIPS, FOUNDATION BREAKERS, PORTABLE HOISTS, ROCK DRILLS.

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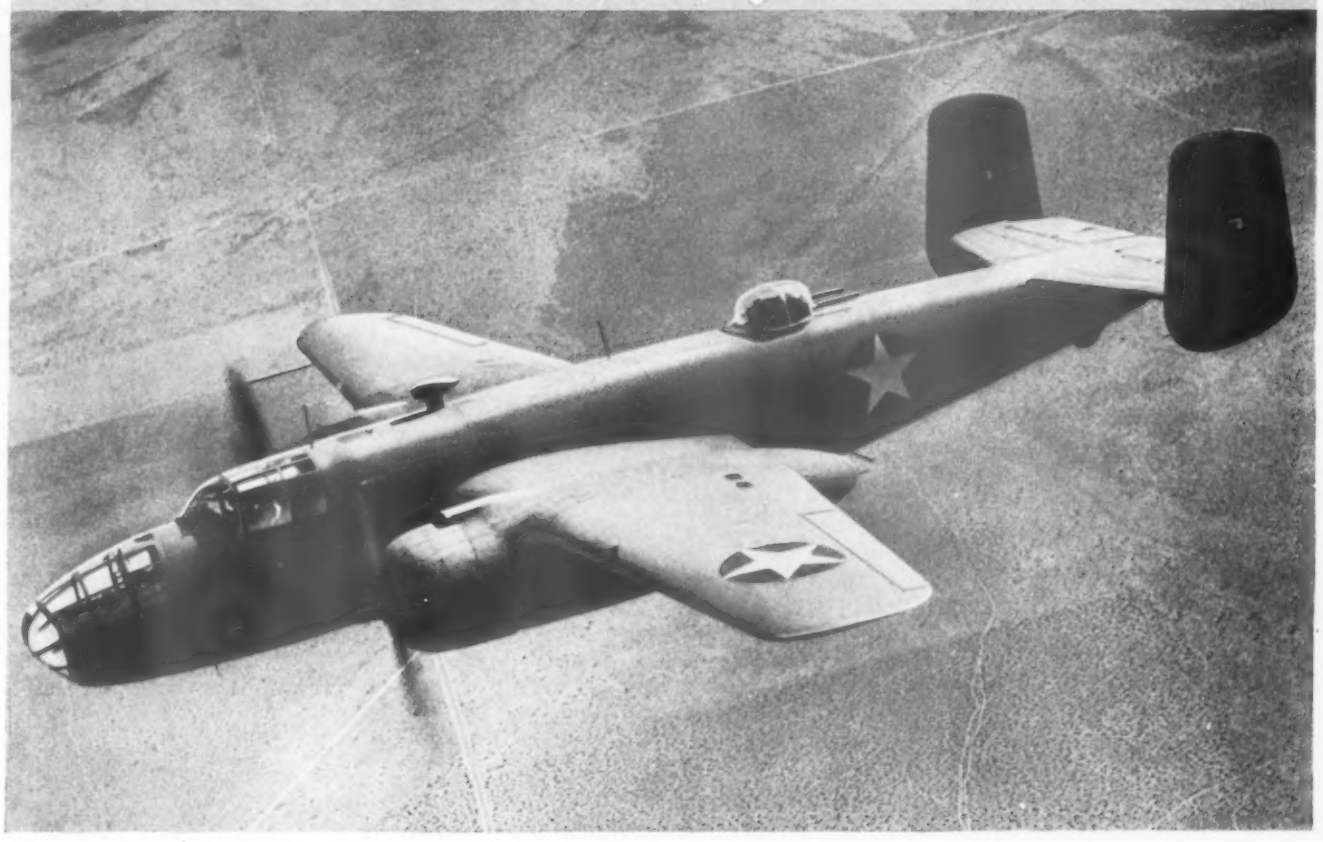
EVER SEE A "SPIDER" With Wings?



The war has made possible great advances in our thinking, our processes, our products. Whoever thought a "bazooka" would annihilate tanks... that a truck could swim like a duck . . . or that a discarded aluminum frying pan could be melted down, refined and become fabricated into precision parts of a glorious flying fighting machine!

Today, thanks to careful segregation of scrap, advances in technical knowledge and precision control of processes, the smelter is producing aluminum ingot of exceptional qualities. Aluminum from smelters is used in planes, tanks, guns, navigation instruments, aerial radios, cameras, engines and many other vital units of our war machine. Federated aluminum ingots will meet your requirements and save you money.

Consulting service available through your nearest Federated office.

PRODUCTS PRODUCED BY FEDERATED METALS

ALUMINUM
BRASS
BRONZE
DIE CAST ALLOYS
SOLDER
BABBITT
TYPE METAL
ZINC DUST

All of these in all commercial forms—Special Alloys to your specifications.

NOTE: *If you are under the impression that ALUMINUM is not permitted in* your *product, refer to WPB's October 28th amendment M-1-i. Restrictions are relaxed and the fabrication from secondary aluminum of many other items not originally allowed is now made possible.*

FMD

Federated

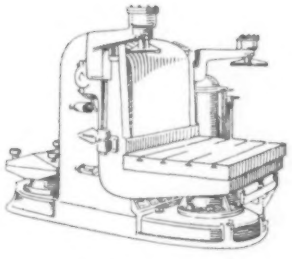
METALS DIVISION

AMERICAN SMELTING and REFINING COMPANY

120 BROADWAY, NEW YORK (5) N. Y.

Nation-wide service with offices in principal cities

A Merry



A Merry Christmas?

Johnnie's dodging Jap snipers somewhere in the South Pacific. Pete stands tense at his battle station on board ship, while death races close with torpedo speed. Mary, who always trimmed the Christmas tree, is on duty with the Wacs.

A Merry Christmas?

At home, lights twinkle on the tree, the gifts stand in brave array, and because of the many vacant chairs, the Christmas feast is laid on a smaller table. Festive holly decks the house, tho' the heart's not festive.

The story of the Christ Child is told again. Then new hope is born with our renewed faith in this story of a Life that was sacrificed to make the world better.

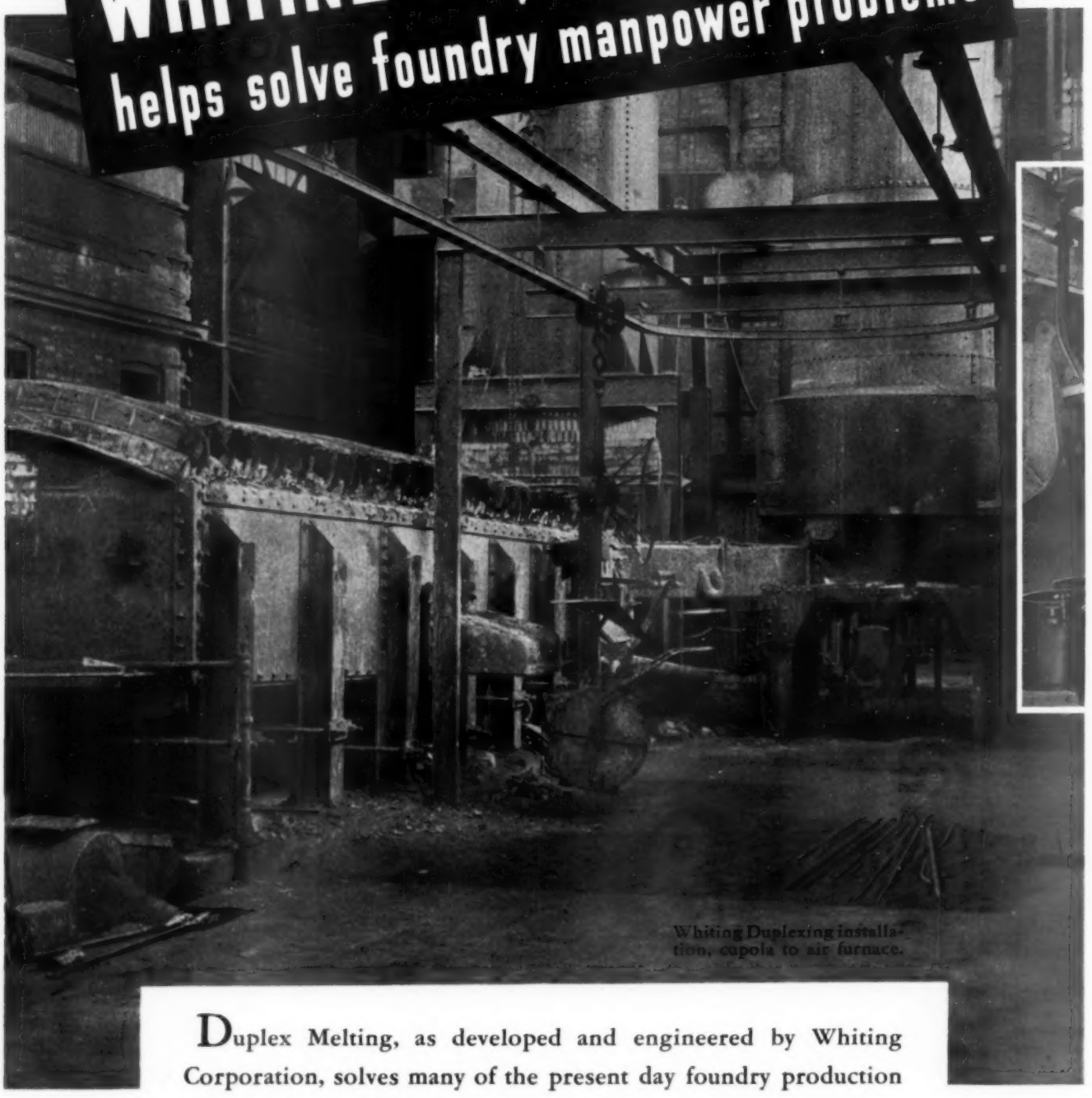
Our boys and girls, too, are sacrificing everything to make this a better world. With a solemn belief in the years to follow this year of sacrifice, we greet you with

Christmas-one and all

DAVENPORT MACHINE & FOUNDRY CO.

DAVENPORT **IOWA, U. S. A.**

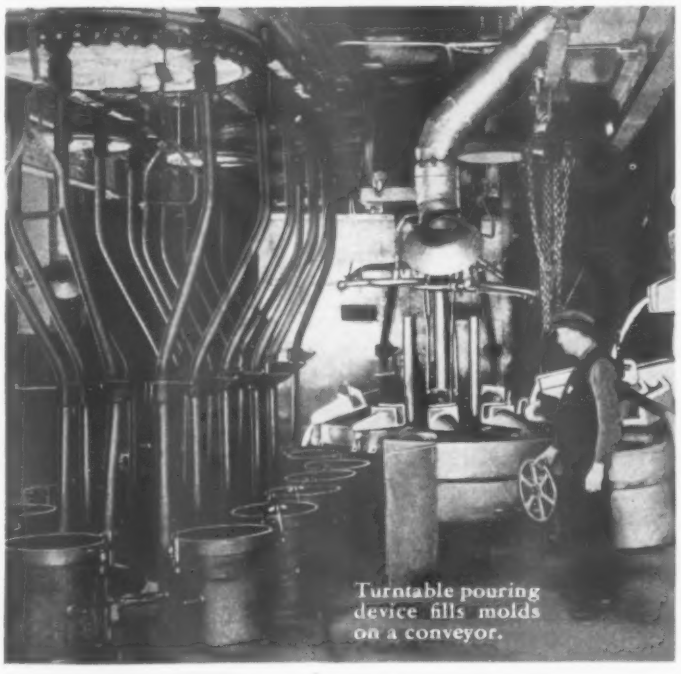
WHITING *Duplex Melting* helps solve foundry manpower problems



Whiting Duplexing installation, cupola to air furnace.

Duplex Melting, as developed and engineered by Whiting Corporation, solves many of the present day foundry production problems. The proper combination of economical melting units will provide the continuous supply of hot metal necessary for efficient mechanization of molding, pouring, and shakeout operations. This mechanization will give greater production per unit of manpower and floor space, at lower production costs, and at no sacrifice in quality of the product. Write Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois.

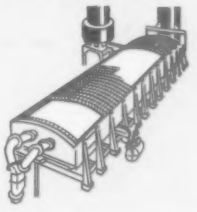
Duplex Melting (with synchronized units) gives a continuous flow of hot metal . . . greater production . . . reduced manpower . . . savings on fuel, labor, and material.



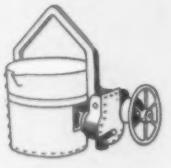
Turntable pouring device fills molds on a conveyor.

Typical Duplex Melting installations combine cupola with air furnace . . . cupola with electric furnace . . . cupola with converter . . . cupola with open hearth and others. In Whiting Duplex and Triplex Melting Systems, firing procedure, temperature control, metal refinement, and alloy additions are carefully considered. Each step is performed in the manner best adapted to the requirements, with each installation individually engineered. It will pay you to let Whiting Engineers make a survey of your plant. Send a letter today.

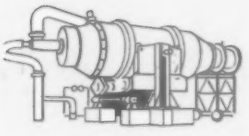
DUPLEXING SYSTEMS



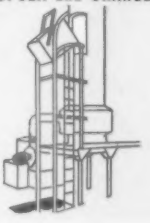
LADLES



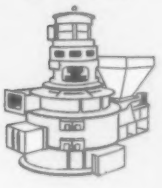
ROTARY FURNACES



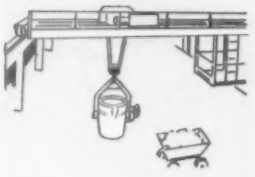
CUPOLA and CHARGER



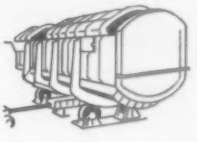
PULVERIZERS



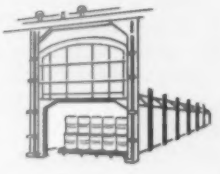
CRANES



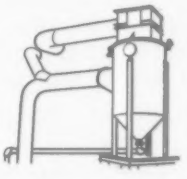
CRADLE FURNACES



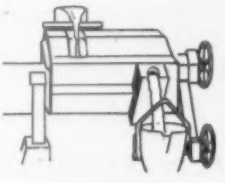
ANNEALING OVENS



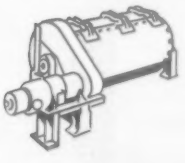
DUST SUPPRESSORS



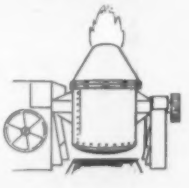
MIXING LADLES



TUMBLERS



CONVERTERS



WHITING CORPORATION

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, and Washington, D. C. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario.

This 40 page Manual ---will help you!

If you operate magnetic separators, this bulletin will aid you in securing better performance from them. Completely illustrated, it covers such subjects as: Magnetism; Electromagnets; Mechanical and Electrical Maintenance; Repairs; Pulley Operating Speeds; Trouble Shooting; Installation Practice; Pulley Selection and Capacities; etc. Tells where and when not to use magnetic pulleys, describes testing procedure, explains how to minimize chance of coils burning out, explains electromagnetism. A valuable, useful guide to separator operation containing material never before written on the subject and data never before compiled under one cover.

Your copy may be secured by writing to Dings.

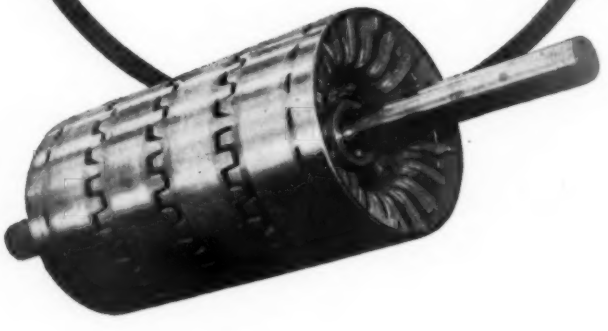
DINGS MAGNETIC SEPARATOR CO.
512 E. Smith St. • Milwaukee 7, Wisconsin
Separation Headquarters Since 1899

Dings MAGNETIC SEPARATION HIGH INTENSITY

THE DINGS MAGNETIC PULLEY

. . . Most Powerful Size for Size!

Dings Pulleys assure you maximum separating ability because: Air-cooling dissipates heat that would reduce magnetic pull; and non-magnetic bronze coil covers do not "short-circuit" or weaken magnetic lines of force. Remember these features and submit your separation problems to Dings.



BAKE BETTER CORES WITH LESS LABOR!

Automatic Operation of Despatch Ovens Saves Manpower for Other Foundry Jobs

With manpower shortage and inexperience as your worst problems now—and for months to come—the labor-saving *automatic* operation of Despatch core ovens offers exceptionally timely help to your entire foundry. It assures uninterrupted flow of top-quality baked cores and helps you use available labor to greater all-around advantage.

REQUIRES NO WATCHING, NO SPECIAL SKILL

Unlike older type ovens, Despatch ovens need no watching. Automatic controls keep heat at right level without human effort. Likewise core placement in chamber no longer takes skill (to avoid hot spots) as uniform high-volume airflow is so distributed that *all* parts of load bake evenly.

This means that less labor is needed all the way around. And men spared here can be used elsewhere in your plant for added efficiency.

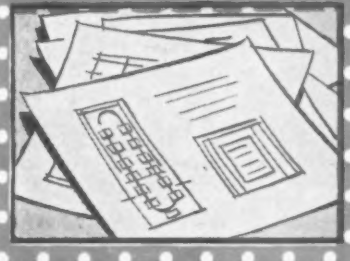
LOADS EASIER, REDUCES WORKMEN'S FATIGUE

Core-baking is made easier, too, with many new types of material-handling systems. These require less labor and conserve space as well. Steps are saved, more work-area is provided for other foundry jobs, and workmen's fatigue is reduced . . . an important factor in *keeping* new help today.

For complete details about Despatch Ovens and how they are suited to your needs of today and postwar, fill out the coupon below.

AUTOMATIC controls keep heat at right level without manual effort. No overshooting nor lag.

HIGH VOLUME heated airflow shoots through adjustable heat-ports to give fast, uniform heating in all parts of chamber.



CONVEYOR systems are available to make handling easier. Use less space, require less labor. All sizes and types available.

DESPATCH OVEN COMPANY MINNEAPOLIS

MAIL THIS VALUABLE COUPON TODAY!

DESPATCH OVEN COMPANY
722 Central Avenue, Minneapolis 14, Minnesota

Please send free details about your new labor-saving core ovens. I am interested in:

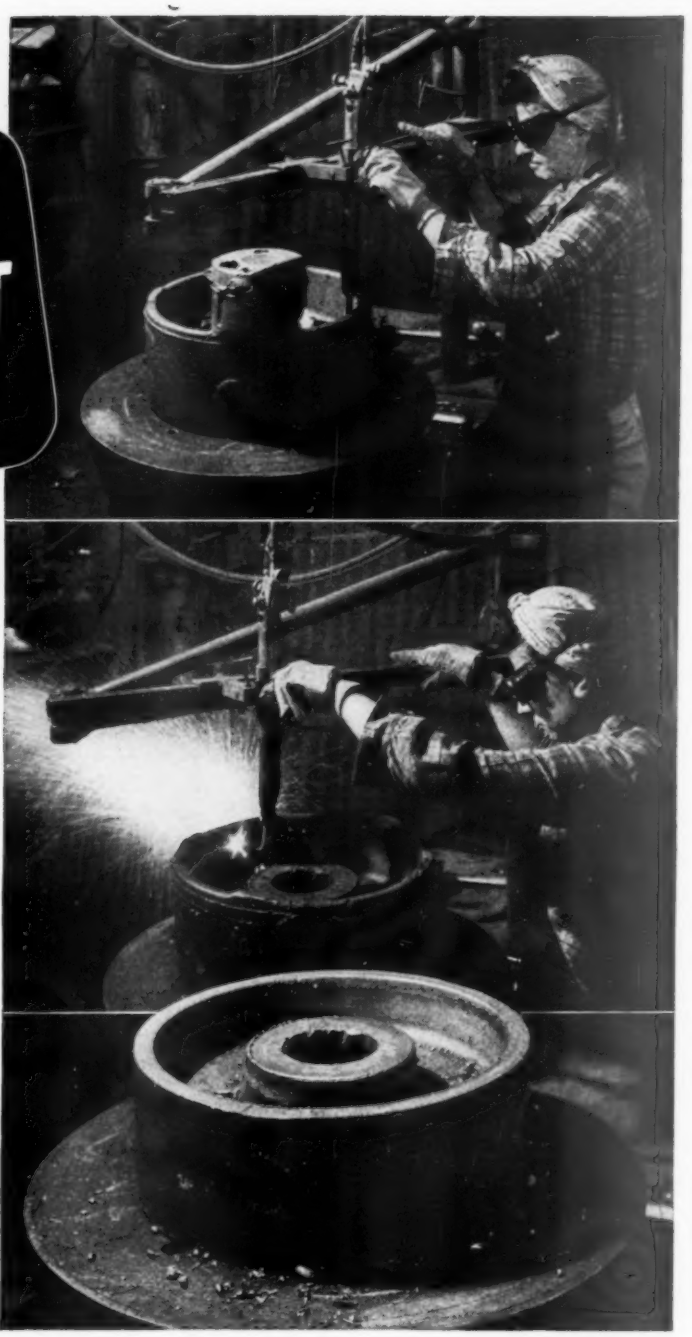
- ☐ Ovens for Non-Ferrous Foundries
- ☐ Ovens for Ferrous Foundries
- ☐ Furnaces, Heat Treating
- ☐ Details about remodeling old ovens
- ☐ Booklet "How To Get More Men For My Foundry" (tips on advertising for help wanted, sample ads, etc.).

Name_____ Title_____

Company_____

Address_____

How to CUT RISERS FAST AND MINIMIZE GRINDING



AIRCO

MACHINE GAS CUTTING

You save time—and minimize grinding by cutting risers with an Airco machine gas cutting set-up like the one shown.

Here two risers had to be cut from each casting. This arrangement employs an Airco cutting torch mounted on an arm so as to permit easy adjustment to any position. The casting is set on a turn-table driven by a variable speed motor, which rotates the casting at a regulated speed under the cutting flame.

This set-up permits quick and accurate removal of both the center and rim risers. The finished cuts are remarkably clean and smooth. With this mechanical set-up, one woman operator completes between 40 and 45 castings each day.

By permitting greater accuracy, uniformity, and speed in riser cutting, this method saves considerable time and cost. Where castings require machining, rough grinding is completely eliminated. In most other cases it greatly reduces the amount of grinding required.

Air Reduction Field Engineering representatives will be glad to assist you in applying machine gas cutting methods. For further information write to your nearest Air Reduction office.

Top: *Cutting the internal riser, 2 1/2" thick and 4" deep.*

Center: *Cutting the rim riser which measures 3/4" thick and 1 3/4" deep.*

Bottom: *The completed casting showing the clean, uniform cut.*

★ ★ ★

BUY UNITED STATES WAR BONDS

AIRCO WILSON

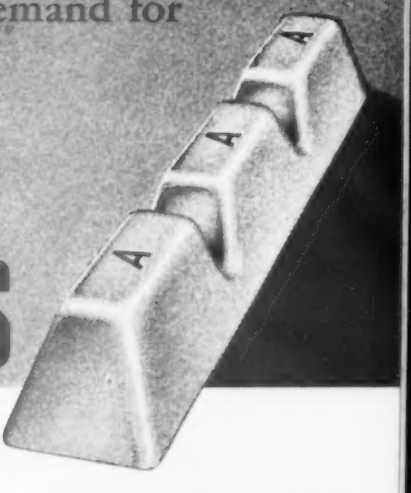
AIR REDUCTION

General Offices: 60 EAST 42nd STREET, NEW YORK 17, N. Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON, TEXAS

"To serve you better"

This group of modernly-equipped plants comprises a unit devoted exclusively to the production of Aluminum Alloys to care for the ever-mounting demand for these versatile and important Alloys.



ALUMINUM REFINERS

Division of

BOHN ALUMINUM & BRASS CORPORATION • **Detroit, Michigan**

General Offices: Lafayette Building

BUY WAR BONDS

MANUFACTURERS OF ALL TYPES AND SHAPES OF CASTING AND DEOXIDIZING ALLOYS

This is what HYDRO-BLAST Told You in 1937

WATER IS ALL RIGHT FOR WASHING CLOTHES

but SAND and WATER IS THE IDEAL COMBINATION

for 1. PRELIMINARY SAND CHIPPING
2. CLEANING THE CASTING
3. SHOOTING HARD COMPLEX CORES

Foundrymen should test Hydro-Blast on the most difficult castings poured in your shops. Investigate this modern method that has proved its superiority, efficiency and economies. Compare Hydro-Blast performances with any other cleaning method, system or device. See Hydro-Blast shoot hard, complex cores . . . remove core rods without bend or distortion . . . clean castings . . . closely sand.

HYDRO-BLAST CORPORATION

WATER is all right for SWIMMING

but SAND and WATER is the IDEAL COMBINATION

for 1. PRELIMINARY SAND CHIPPING
2. SHOOTING HARD COMPLEX CORES
3. CLEANING THE CASTING

Hydro Blast is a self-contained production unit for knocking out cores and sand blasting the casting in one operation at lower cost.

Because Hydro Blast creates no dust, it requires no capital investment in non-productive auxiliary mechanisms.

We invite interested foundry operators to see the Hydro-Blast at work . . . see sand and water shoot hard complex cores; remove rods without bend or distortion; clean the casting closely sand.

Write today for Bulletin No. 102

HYDRO-BLAST Corporation
111 W. WASHINGTON ST., CHICAGO, ILL.

WATER is all right for BATHING

but SAND and WATER is the IDEAL combination

for 1. PRELIMINARY SAND CHIPPING
2. CLEANING THE CASTING
3. SHOOTING HARD COMPLICATED CORES

Of course, Hydro-Blast creates no dust when performing these highly essential foundry functions, as a result of its many overwhelming and advanced methods.

Every foundry operator should see Hydro-Blast at work . . . see the sand and water shoot hard complex cores . . . remove core rods without bending or distorting . . . clean the casting . . . closely the sand.

HYDRO-BLAST Corporation
111 W. WASHINGTON ST., CHICAGO, ILL.

WATER is all right for SCRUBBING FLOORS

but SAND and WATER is the IDEAL combination

for 1. PRELIMINARY SAND CHIPPING
2. CLEANING THE CASTING
3. SHOOTING HARD COMPLICATED CORES

Foundrymen who witness the sensational performances of HYDRO-BLAST on the highly essential and frequently troublesome foundry functions, are unanimous in their approval of this most modern method.

Every foundry operator is invited to see HYDRO-BLAST at work . . . shooting hard complex cores . . . removing core rods without bend or distortion . . . cleaning difficult castings . . . closefying sand . . . WITHOUT CREATING DUST.

HYDRO-BLAST Corporation
111 W. WASHINGTON ST., CHICAGO

DIRTY-FACE CHILDREN need SOAP and WATER

Now you listen to your Dad while he tells you how to wash that dirty face without running Mother's embroidered guest towels. Go into the bathroom, turn plenty of soap and water, rub until you fairly shine, then rinse all the suds off with oodles of water before using the towel.

Remember, none of that "lick and promise" stuff goes if you want to visit the plant to see that new Hydro-Blast room where we handle preliminary chipping, shoot hard complex cores, clean castings and conditions sand; all in one operation.

"The last time I took you through our foundry you saw a lot of men operating pneumatic chippers. Many of our best men worked ceaselessly on that job, but they couldn't get the work absolutely clean and our customers complained. Invariably we'd leave small pieces of scale and fine sand particles because the castings were not thoroughly scoured with water.

"So we installed the Hydro-Blast to really clean the castings at low cost. The wet sand and water at 1,200 pounds pressure scours the castings absolutely clean and keeps our customers happy, just as lots of soap and water cleans your face and hands and keeps Mother in good humor."

WET SAND AND WATER AT 1,200 POUNDS PRESSURE

HYDRO-BLAST Corp.

This is what

HYDRO-BLAST Can Show You Today

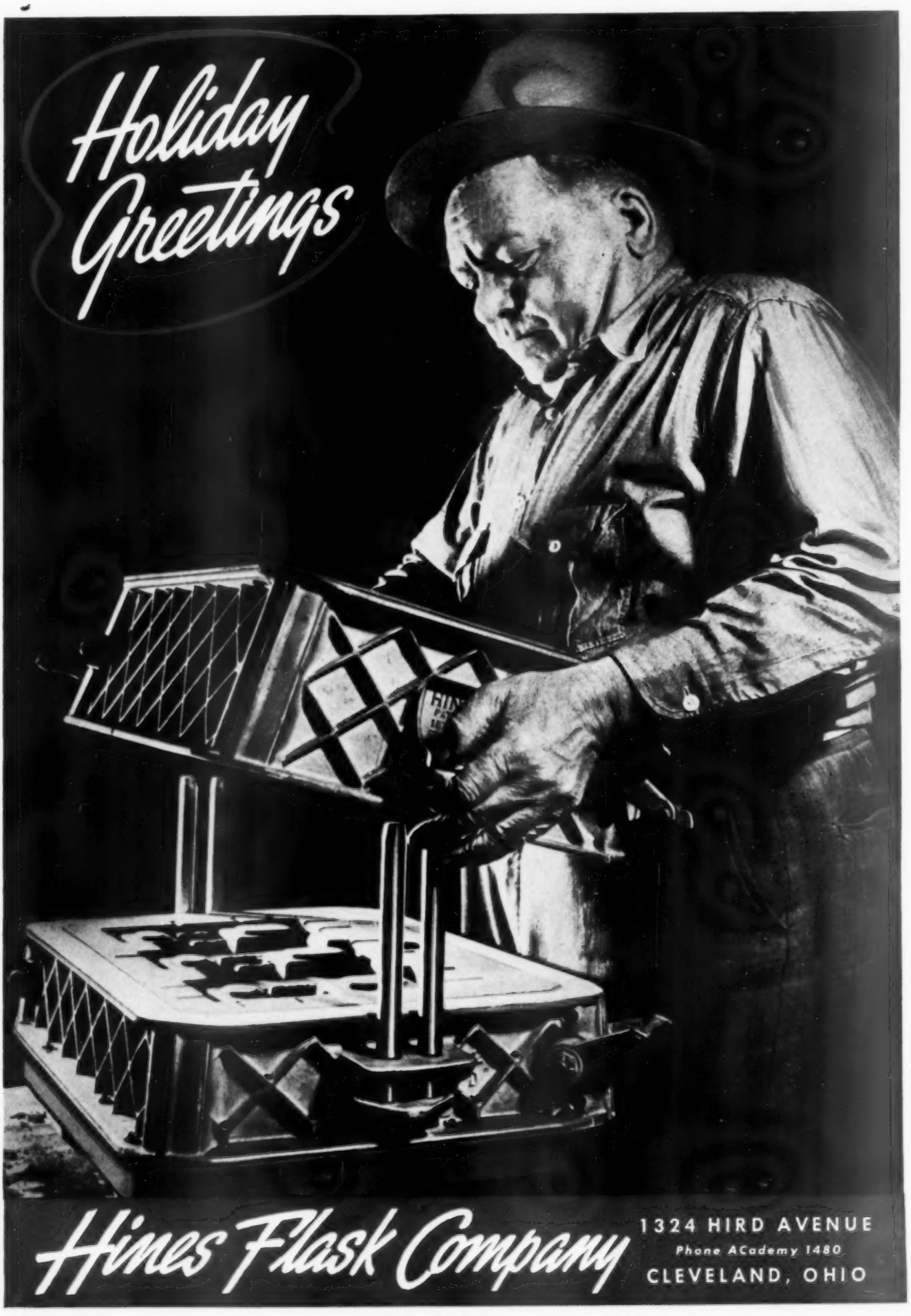
You can see more than 50 of America's leading foundries using the Hydro-Blast method to decore and surface clean all kinds of castings to microscopic cleanliness so that less machining is required and tools are not dulled prematurely by the abrasive action of imbedded sand particles. You can see the most complex cores quickly give way to the scrubbing, scouring effect of wet sand and water propelled at a velocity exceeding 3 miles per minute.

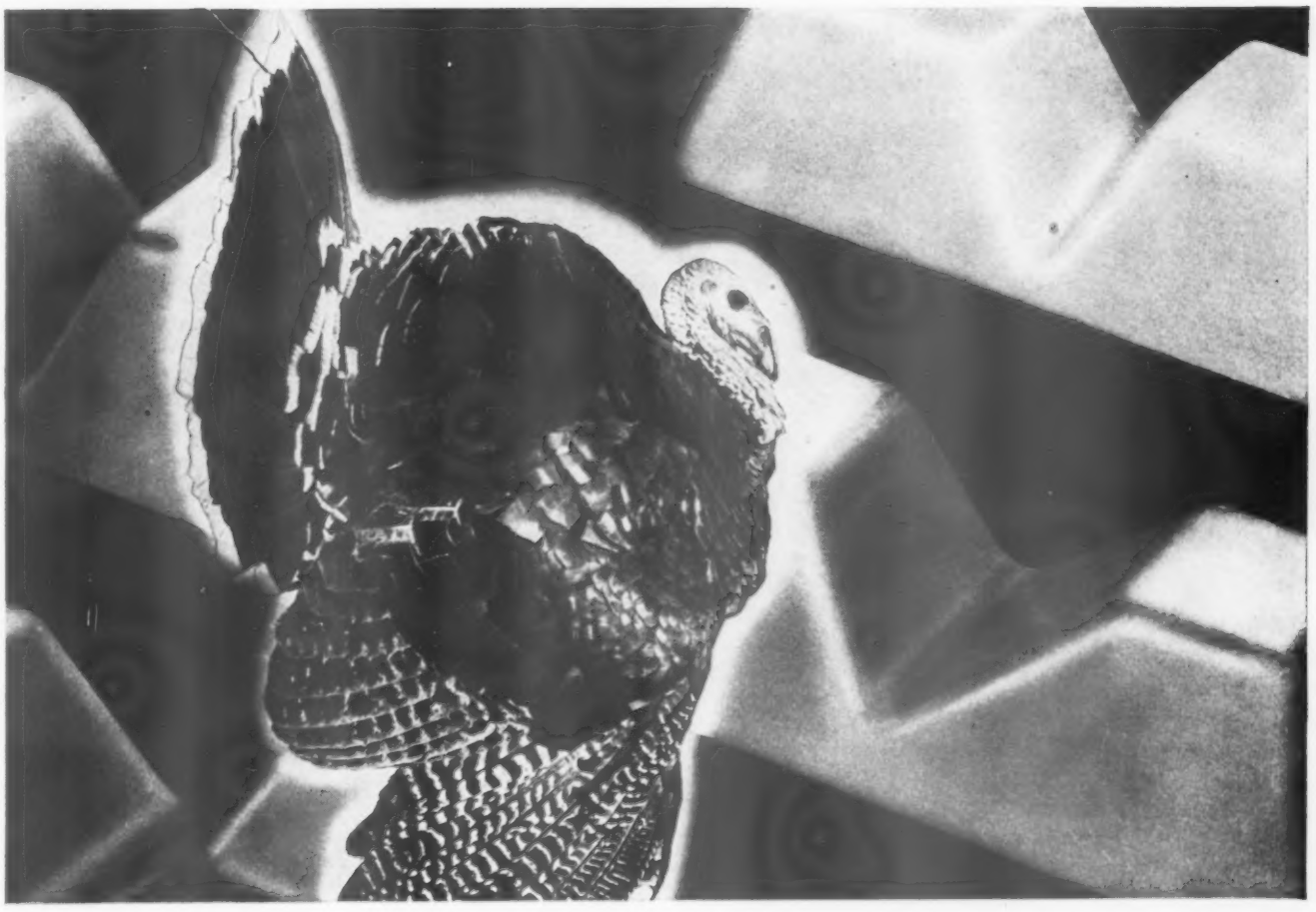
You will also see how Hydro-Blast can return your investment during the first year of operation through the recovery of presently wasted sand in better-than-new condition, and at a cost of only 75 cents per ton including labor, power, water and maintenance.

Further, you can witness how Hydro-Blast helps to solve the cleaning room labor problem by employing only two unskilled laborers and a Hydro-Blast to perform the dirty, back-breaking labor of ten chippers.

We'll gladly show you such outstanding accomplishments without obligating you in any way.

THE HYDRO-BLAST CORPORATION, *2550 N. Western Ave., Chicago 47, Illinois*


Holiday Greetings
Hines Flask Company
1324 HIRD AVENUE
Phone ACademy 1480
CLEVELAND, OHIO



LET'S TALK TURKEY ABOUT ALUMINUM ALLOYS

• It's about time to stop talking about *secondary* aluminum. *Any* aluminum alloy which meets the rigid specifications of the government and of technical societies is equal to its task. We—the undersigned companies—produce such alloys, under strictest laboratory controls.

The members of the Aluminum Research Institute are meeting the demands of war production with furnaces that smoke by day and flare by night, to furnish the ingots imperatively needed. We will meet the demands of postwar industrial expansion in common sense American fashion, with aluminum alloys that will play a crucial part in peacetime planning and achievement.

It's time to talk turkey: The war has proven the value of our product. The aluminum alloys that we produce have come of age. No longer should they be called "secondary." In peace as in war, our aluminum alloys will do a "primary" job.

Aluminum and Magnesium, Inc.,
Sandusky, Ohio

The American Metal Company, Limited
New York City

Apex Smelting Co.
Chicago, Illinois

The Cleveland Electro Metals Co.
Cleveland, Ohio

Federated Metals Division American Smelting and Refining Company
New York City and Branches

General Smelting Company
Philadelphia, Pennsylvania

William F. Jobbins, Inc.
Aurora, Illinois

R. Lavin & Sons, Inc.
Chicago, Illinois

The National Smelting Company
Cleveland, Ohio

Niagara Falls Smelting & Refining Corp.
Buffalo, New York

Sonken-Galamba Corporation
Kansas City, Kansas

U. S. Reduction Co.
East Chicago, Indiana

ALUMINUM RESEARCH INSTITUTE

308 West Washington Street, Chicago 6, Illinois

Miss War Worker and a TRANSPORTER

3 to 1

STEP UP MATERIAL HANDLING 3 to 1

● In the conventional way of transporting tons of bulk material of various sizes and shapes, or packaged products, it requires STRAINING, TUGGING, PULLING, PUSHING, and great physical effort.

Today, with girls required to do men's work, your transportation of materials can be simple as this —

Miss War Worker and a TRANSPORTER can transport the same tonnage of material a given distance that would require the physical effort of three men handling in the conventional way.

☆

Automatic TRANSPORTER

★ This mechanized handling is a valuable factor all along the production line. The TRANSPORTER is particularly adaptable to short hauls and for use in elevators, narrow aisles, and areas where floor loads are restricted. It supplements larger industrial trucks to effect a complete handling system. The trucker simply walks along with the load. The TRANSPORTER is built in 4000- and 6000-pound capacity platform type lift trucks for skid transportation and in a pallet type fork lift truck for unit loads up to 4000 pounds on open or double-faced pallets. Write for details.

POSITIVE MECHANICAL BRAKE

CONTROLS IN STEERING HANDLE

FORWARD AND REVERSE SPEEDS

FRONT WHEEL POWER DRIVE

SHOCKLESS HYDRAULIC PLATFORM LIFT WITH EASY FOOT CONTROL

MANUFACTURERS FOR OVER THIRTY FIVE YEARS *Electric Propelled* INDUSTRIAL TRUCKS

AUTOMATIC TRANSPORTATION CO.

121 WEST 87th STREET — DIV. OF THE YALE & TOWNE MFG. CO. — CHICAGO 20, ILLINOIS

RANSOHOFF WET CLEANING MILLS
Automatic Star-Return

IT'S IN THE STARS

SIDE-LOADING,
SIDE-UNLOADING MILL

Close-up showing a Side-Loading Mill with work and stars in place. Most of the work is buried in the stars for best cleaning results. Note the star-return gratings in the heads of the cleaning compartment. Castings being cleaned are malleable iron differential housings.

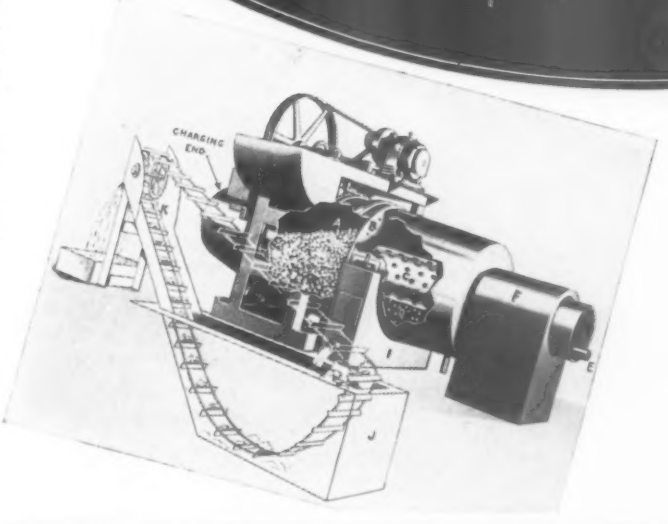
THE RANSOHOFF WET METHOD SAVES 30% to 70% ON YOUR CLEANING COSTS

THE SECRET of the success of foundry cleaning with RANSOHOFF WET CLEANING MILLS is MASS cleaning. This involves holding the work in suspension in a moving mass of tumbling material confined in a revolving drum. As the drum revolves the work wallows in a practically voidless mass of tumbling material—it CASCADES IN AND AS A MASS. The cleaning material scours the work subjecting it to a thorough scrubbing which reaches into the most remote corners. *The entire surface of each casting is cleaned.* Sharp corners are preserved and delicate designs in relief or indentation are left sharp and distinct.

CONSULT RANSOHOFF'S ENGINEERS

Let them solve your cleaning problems.

SEND FOR NEW CATALOG



BASIC DESIGN OF RANSOHOFF END-LOADING END-UNLOADING CLEANING MILL

•

NO HEALTH HAZARDS

•

NO DUST-COLLECTING SYSTEMS TO INSTALL

•

NO DUSTY SAND

•

NO MUDHOLES

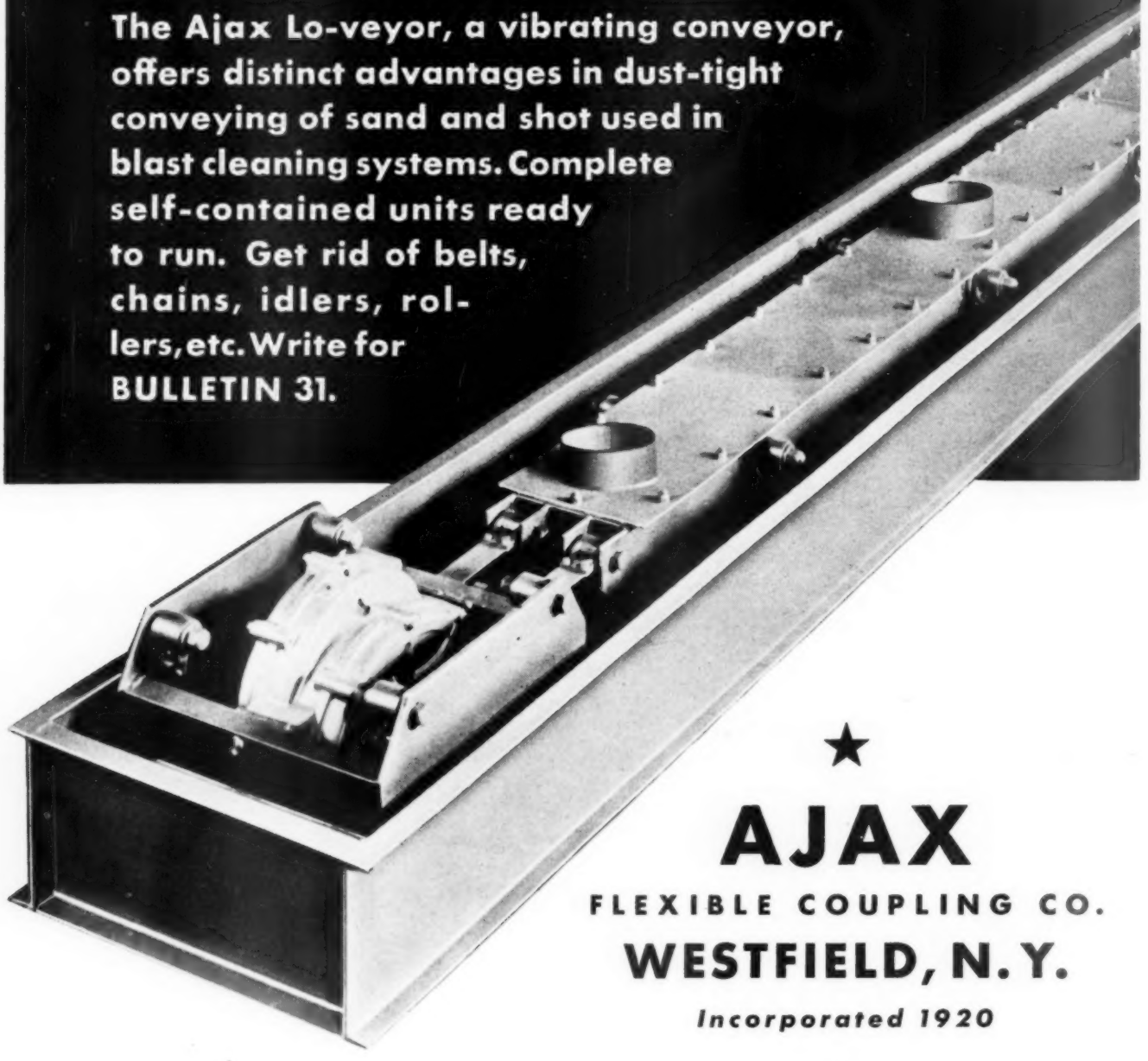
N. RANSOHOFF, Inc. CINCINNATI, OHIO
Township Ave. and Big 4 R. R.

REPEAT ORDERS FROM PRODUCTION FOUNDRIES PROVE THAT

AJAX LO-VEYORS

are their own best Salesmen

The Ajax Lo-veyor, a vibrating conveyor, offers distinct advantages in dust-tight conveying of sand and shot used in blast cleaning systems. Complete self-contained units ready to run. Get rid of belts, chains, idlers, rollers, etc. Write for BULLETIN 31.



★

AJAX

FLEXIBLE COUPLING CO.

WESTFIELD, N. Y.

Incorporated 1920

★

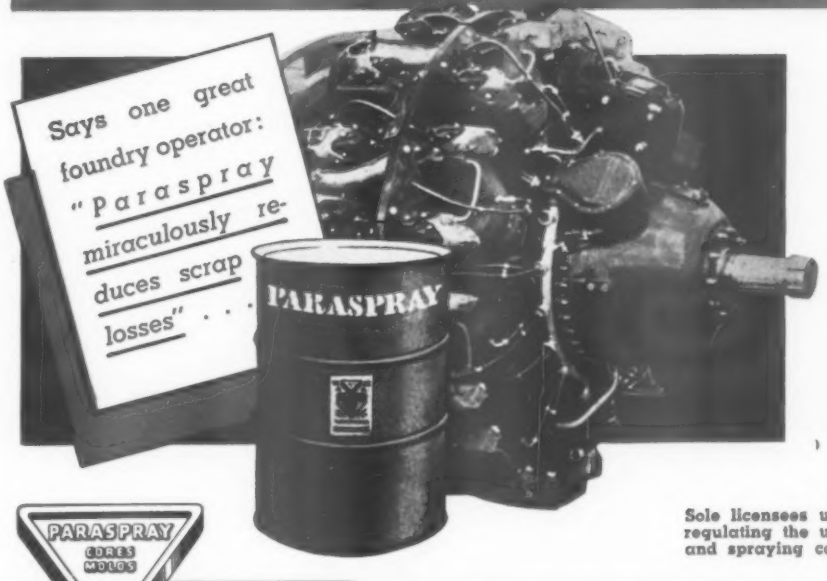
PARASPRAY

CORE-MOLD COATING

WITH TODAY'S NEED OF SPEED

It takes more casting to do more blasting from the air—and today PARASPRAY Core-Mold Coating is giving founders the means to turn out intricate airplane engine castings with the highest percentage of "perfects" yet reached, breaking all speed records.

TOMORROW - *WHEN THE LID'S ON THE BIDS - - -*



and you have to hobble the overhead to gobble the orders, PARASPRAY Core-Mold Coating will cut costs while improving the castings. It provides new "lows" in porosity and eliminates blow holes.

PARASPRAY CORES MOLDS

PARASET CORE BINDER

PARACOAT FOR PATTERNS

Sole licensees under the Saeger Patents exclusively regulating the use of rubber compounds in making and spraying cores and molds.

FOUNDRY RUBBER COMPOUNDS CORP.

1050 - 30th St., N. W. Washington 7, D. C. REpublic 2256

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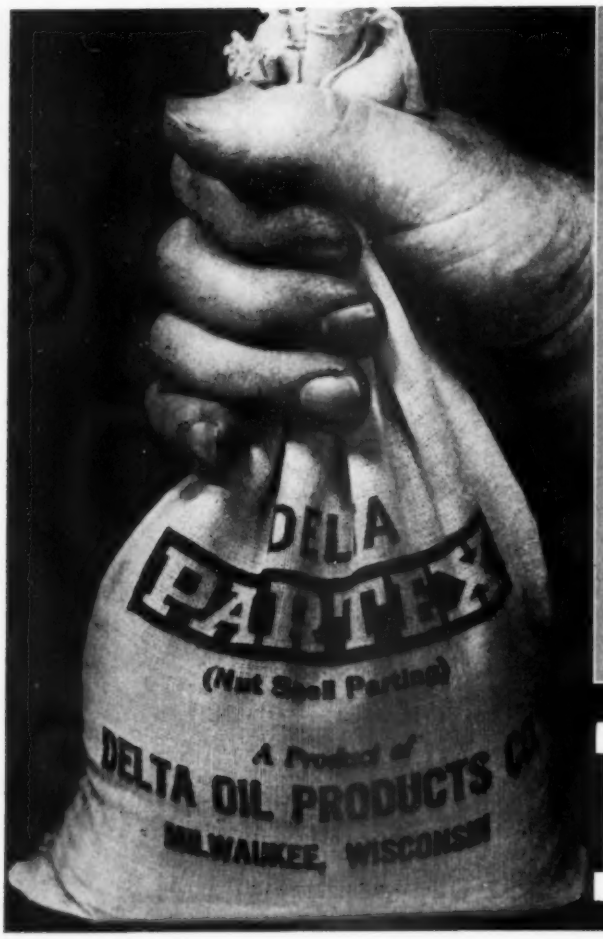


FOR FASTER PRODUCTION OF CORES AND MOLDS *use* DELTA PARTEX

the SAFE, NON-HAZARDOUS Nut Shell Parting

DELTA PARTEX is the Lycopodium replacement product so widely used by leading foundries all over the nation. It is made from pulverized NUT SHELLS and is absolutely safe to use.

It dusts freely and covers all surfaces uniformly. It works FASTER, SAVES TIME and LASTS LONGER. Core boxes and patterns STAY CLEANER with FEWER APPLICATIONS.

For BEST RESULTS use PARTEX SPARINGLY; only a light dusting is necessary.

{Protected by United States Patents Allowed}

NOTE THESE IMPORTANT ADVANTAGES OF DELTA PARTEX

1. No *Silicosis* hazard. **2.** Has the properties and characteristics of *Lycopodium*. **3.** Is *non-reactive* with molten metals. **4.** Will *not pit, nor etch*, metal patterns and core boxes. **5.** Will *not contaminate*, nor reduce, *fusion point* of core and molding sands. **6.** Has *uniform surface affinity* for sand which eliminates building up in corners of core boxes and patterns. **7.** Leaves *casting surfaces clean* and free from contamination for plating work. **8.** Is *free-dusting* through shaker bag. **9.** Is *moisture-resisting* and *will not deteriorate* on aging.

ARMY E NAVY

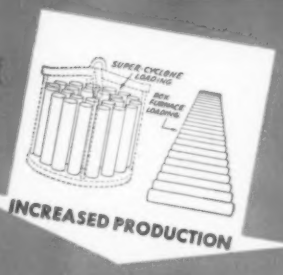
DELTA OIL PRODUCTS CO.

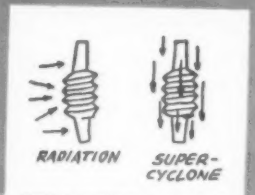
MANUFACTURERS OF INDUSTRIAL & AUTOMOTIVE OILS, GREASES & COMPOUNDS

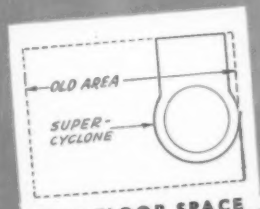
MILWAUKEE 9, WISCONSIN

You get these advantages with the

LINDBERG SUPER-CYCLONE







Large loads are accurately heated and easily handled

The revolutionary idea of heating steel to 1750°F. with recirculated air is embodied in the Lindberg Super-Cyclone Furnace. This principle with its accuracy, rapid uniformity and close control of heating offers many advantages, a few of which are listed below.

INCREASED PRODUCTION

The Super-Cyclone Furnace has increased production in the hardening of shells, rifle barrels, flanges, slip yokes, worm gears, bearing races, tank parts and hundreds of similar items. In some cases, production has increased *twelve times* over older methods of heat treating. Bulletin 130 shows how you can figure possible production increases on your own work.

STRAIGHTER WORK

The Super-Cyclone's 100% forced convection heating principle heats the work rapidly and uniformly and eliminates the possibility of one-sided or radiant heat from striking the charge and causing distortion. Straightening time is eliminated or reduced to a minimum. Valuable man hours are released from the press for other work.

LESS FLOOR SPACE

Based on averages of what the Super-Cyclone has done in other plants, you can figure that it will not occupy more than 1/3rd the floor area demanded by conventional equipment to handle the same or greatly increased production.

EXTRA MAN HOURS AVAILABLE

The Super-Cyclone method of handling work on fixtures or in baskets, eliminates the individual handling of parts in heating and quenching. In many plants, lone operators handle large loads through successive steps of heat treatment, for example, forgings are normalized, hardened and tempered in the same Super-Cyclone without being removed from the fixture.

SPECIAL HEATING

Because the Super-Cyclone can be heated at any desired rate to 1750°F. and cooled according to a definite schedule, it is well suited to stress relieving, cycle annealing, malleablizing, and other heating operations requiring a specific cycle. Write for the Super-Cyclone Bulletin 130.

LINDBERG ENGINEERING COMPANY
2453 West Hubbard Street • Chicago 12

ARMY E NAVY

LINDBERG FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

The Adams Cherry Slip Flask

In Design . . . In Construction . . . In Performance . . .

Adams Flask Equipment Excels!

To assure proper fit and to guard against runouts, include Adams Jackets on your orders for Adams Cherry Snap Flasks, Adams Cherry Slip Flasks, or the Adams Aluminum Slip Flask.

Illustrated is the Adams Cast Iron Jacket. Steel Jackets are also available.

When you purchase Adams Flask Equipment you are assured of superior design and construction, resulting from the experience gained in over forty-five years of flask manufacture.

Important features include maximum rigidity without excess weight, ease of handling and exact conformity with your requirements, all of which add up to better performance and more economical production.

The Adams Company

1883—Our 60th Year—1943

800 Foster St., Dubuque, Iowa

MOLDING MACHINES **ADAMS** **FLASK EQUIPMENT**

Foundry

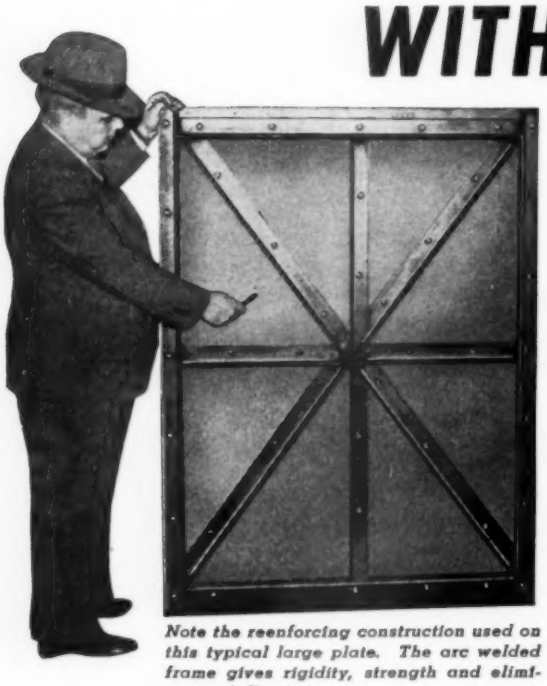
METAL CUTTING MACHINE

Keeping ahead of trends in the processing of magnesium and aluminum castings, DeWalt introduces this specially designed machine for removing gates and risers. Completely new in foundry methods, this DeWalt puts the cleaning room *on a production schedule* and increases the efficiency of the entire foundry. Write for descriptive literature

DE WALT PRODUCTS CORPORATION

LANCASTER, PENNSYLVANIA

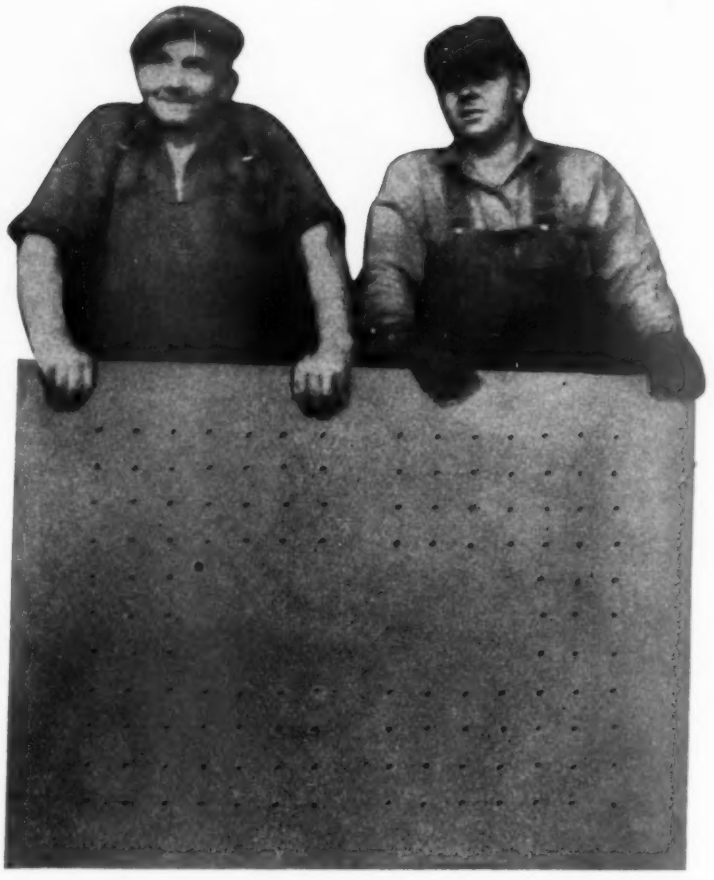
CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!



Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.



You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

"6 Point" Conditioned Sand—

a "must" in pouring castings for aircraft motor bearings

at Saginaw Bearing Company—

makers of bronze bearings used in airplane motors and producers of the well known Agricola and Sabeco bronzes, the Royer shown above is at work. Only the best is good enough for the bearings in the motors of our fighting planes —and that means the best in casting practice as well as materials. The sand in which these bearings are cast must be properly conditioned. That's why a Royer Sand Conditioner is used, as is the case in so many foundries where castings are being produced which must conform to air corps or other rigid armament specifications. Over 5,000 Royers are now in service.

The clean, open, velvety smooth, double-aerated sand produced by the Royer makes true-to-pattern molds—resulting in smoother finish castings which require less cleaning and substantial reductions in discount. Only the Royer provides these "6 point" sand conditioning values: (1) thorough refuse removal; (2) positive lump breaking; (3) complete blending and mixing; (4) even distribution of moisture; (5) increased permeability; and (6) double aeration—once at the belt and again at the discharge.

There's a Royer for every foundry. Write for full information.

THE ROYER

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE STREET
KINGSTON, PA.

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

JOBS IN PEACE TIME

To get music you encourage musicians . . . .
To get paintings you encourage artists . . . .
Jobs are made by men of daring, initiative and creative thought who risk something in starting a project . . . men who then contract with others to help bring their ideas to fulfillment.

". . . the nation which wishes to be great, must place enterprise ahead of security. It must regard innovators, experimenters, starters of enterprises, as peculiarly useful citizens and go out of its way to furnish them a congenial and hospitable environment . . . It must strive to increase the proportion of its citizens, who become experimenters and innovators and who make their living, not by getting on someone else's payroll, but by creating payrolls of their own."

SUMNER H. SLICHTER
Professor of Economics
Harvard University

NORTH AMERICAN for COMBUSTION

THE NORTH AMERICAN MANUFACTURING COMPANY
MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL
BRANCH OFFICES *with* FIELD ENGINEERS *in* PRINCIPAL CITIES
CLEVELAND 4, OHIO

PHOTOS BY LAMBERT

This Pantograph Shoe of High-Chromium Iron Lasted 10 Years

TEN YEARS of sliding metal on metal is a severe test for any abrasion-resistant material. But that is the record of this pantograph shoe, the trolley contact for a mix car in a metallurgical plant. After 10 years the shoe made of about 27 per cent chromium iron is still in service. Shoes of other grades of hardened steel on the same job last four months.

Iron castings of 26-28 per cent chromium outperform other commonly used wear-resistant metals and alloys in applications involving extreme wear . . . particularly where there is considerable abrasion without undue shock. These castings are unusually easy to cast.

Castings of high-chromium iron have given outstanding service in dredge-pump liners, sludge-pump liners for oilwell drilling, equipment for coke crushing, screening, and conveying systems, and rock-handling equipment such as crusher jaw plates, crusher rolls, and chute liner plates.

High-chromium high-carbon irons are readily made in either the crucible or electric furnace by melting procedures customary for high-chromium steels. For information on their composition, heat-treatment, and physical properties, write for the booklet, *Abrasion-Resistant High-Chromium* Iron.

★ *BUY UNITED STATES WAR BONDS AND STAMPS* ★

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
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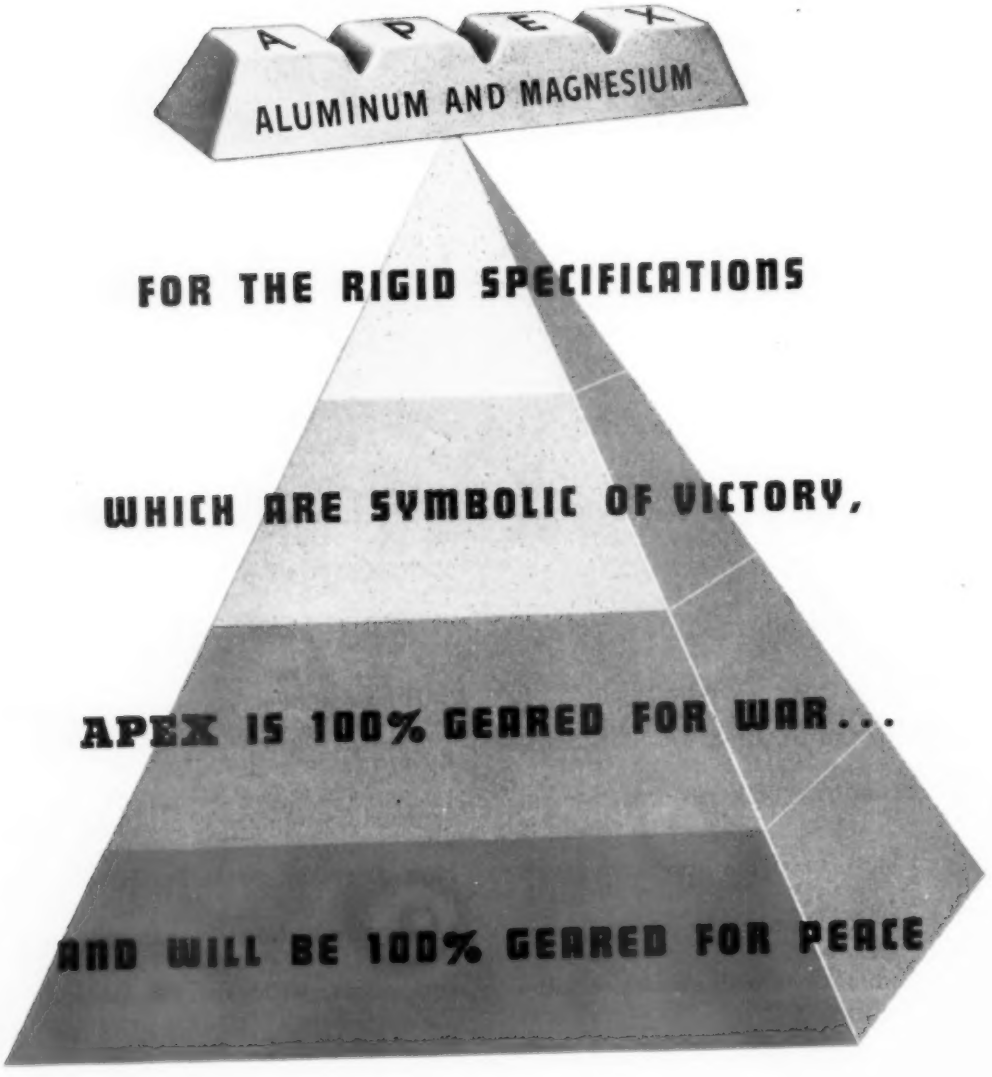
Trade Mark
Ferro-Alloys & Metals

APEX


A P E X
ALUMINUM AND MAGNESIUM
FOR THE RIGID SPECIFICATIONS
WHICH ARE SYMBOLIC OF VICTORY,
APEX IS 100% GEARED FOR WAR...
AND WILL BE 100% GEARED FOR PEACE

SMELTING
COMPANY
CHICAGO, ILLINOIS

Dust Control at the Lowest Ultimate Cost

The first cost of your dust and fume disposal equipment may be as much, or as little, as you wish. But the system which costs least in the long run is the one which does a thorough job of dust removal—lowest operating and maintenance cost considered.

On the thoroughness of your dust collecting system depends the increase in human efficiency and output obtained by the elimination of dirty, dust-laden air from the working zones. Whether it be in a busy era of high wages and liberal profit margins or in a period of keen competition, clean air is always an important profit factor.

The efficiency of the Schneible Wet Method of dust collection has been demonstrated through the years in hundreds of foundries. The management of leading aircraft, automotive and agricultural equipment foundries—and hundreds of jobbing foundries, large and small—use the Schneible Multi-Wash System to rid themselves of their dust problem.

They are fool-proof and maintenance free; require no attendance other than to switch on the motor. The water, or other cleansing liquid, may be used over and over again in the collector system. There is no secondary problem created by a bothersome accumulation of dust. Nothing to clog, burn or freeze. The collected matter, as sludge, is disposed of readily. *Users can forget they have a Schneible!*

Let our trained engineers help you with your dust and fume problems.

Now Make THOUSANDS More

NOTE OUR NEW ADDRESS

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth Street
Detroit, Michigan

SCHNEIBLE

It is practical experience that counts in applying Super Refractories

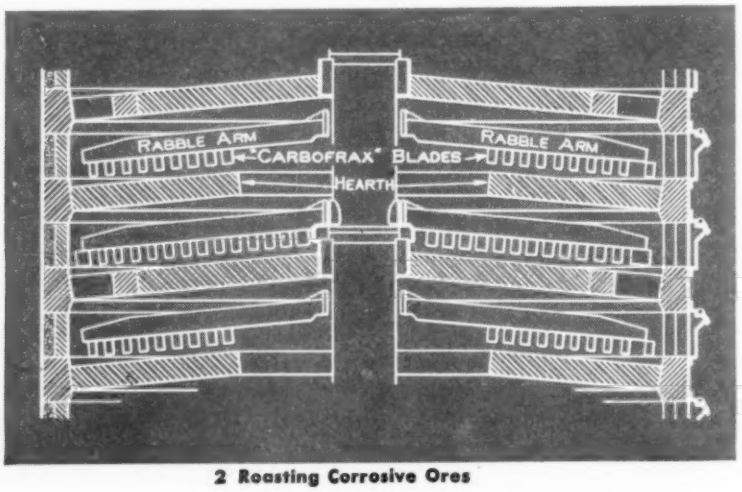
IN firing steatite—roasting corrosive ores—treating metal parts—reducing and refining non-ferrous metals, radically different conditions are encountered. Yet, in these diverse operations there is a common need—the need for super refractories such as produced by Carborundum. With the variable conditions existing in these as well as numerous other types of installations, no one grade or kind of super refractory is capable of meeting their individual requirements.

There are now more than sixty-five varieties of Carborundum Brand Super Refractories, each designed to withstand specific service needs. But of equal importance is the ability of our engineering staff to select the right super refractory for the purpose and apply it to a given installation.

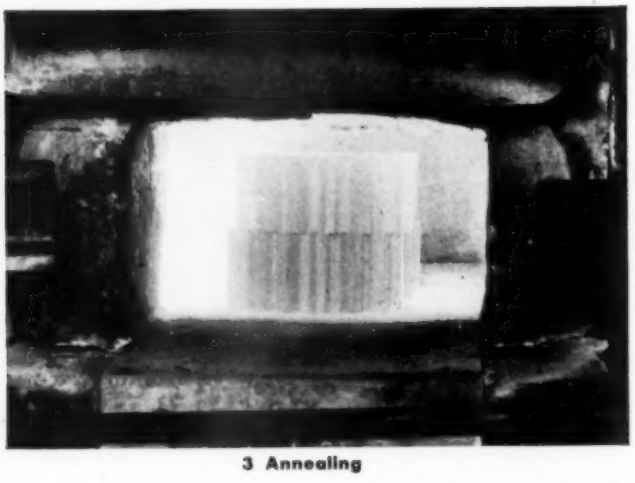
Our comprehensive understanding of refractory problems—gained from years of practical and technical experience—has proved exceptionally valuable to war industry plants. It will be equally advantageous to operators of new and improved processes for the post war era.

Let us consult with you on your refractory problems.

1 Firing Steatite



2 Roasting Corrosive Ores



3 Annealing

4 Reducing and Refining Non-ferrous Metals

Every hour this war is shortened will save $12,000,000. The lives it will save are priceless. Let's get it over with—quickly!

REFRACTORY CARBORUNDUM PRODUCTS

Refractory Division, **THE CARBORUNDUM COMPANY,** *Perth Amboy, N. J.*

REG. U. S. PAT. OFF.

MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

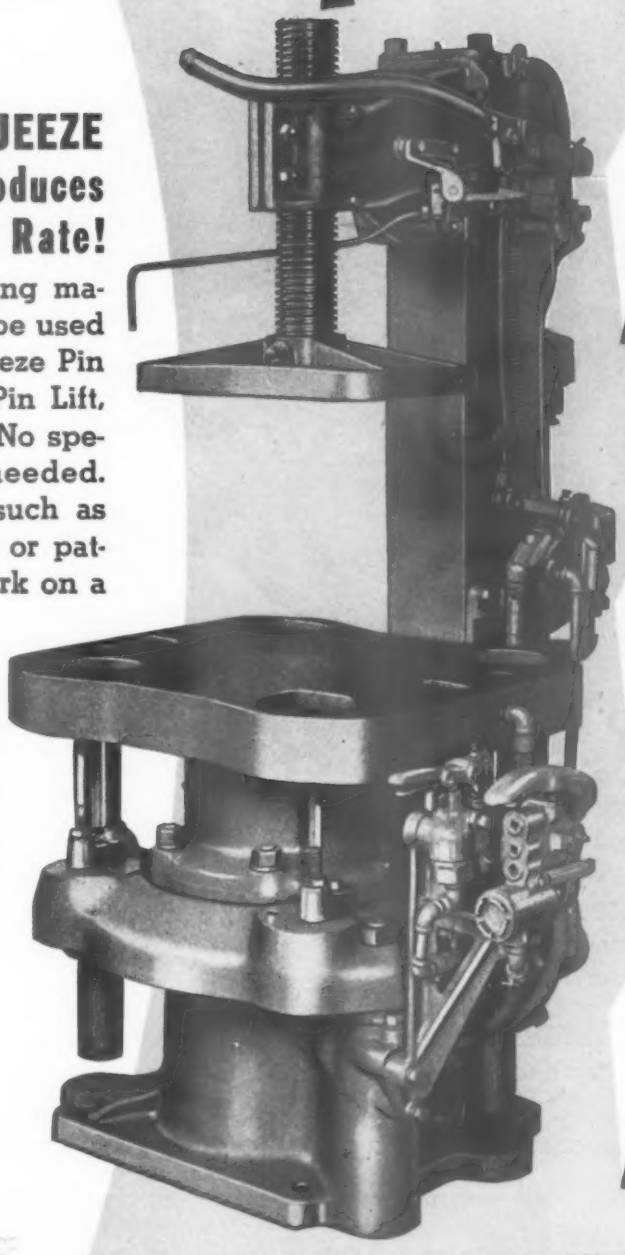
District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum, Carbofrax, Alfrax and Mullfrax are registered trade-marks of and indicate manufacture by The Carborundum Company)

Speed Up PRODUCTION with this TRIPLE DUTY Molder

LWAUKEE JOLT SQUEEZE N STRIPPER . . . Produces curate Molds at Fast Rate!

k about a versatile molding ma-ne — here's one that can be used ee ways — as a Jolt Squeeze Pin pper, as a Jolt Squeeze Pin Lift, as a plain Jolt Squeezer. No spe-l pattern equipment is needed. ndles simple equipment such as terns mounted on boards or pat-n plates. Puts jobbing work on a , production basis.



Use it as a JOLT SQUEEZE PIN STRIPPER

Use it as a JOLT SQUEEZE PIN LIFT

Use it as a JOLT SQUEEZER

The Milwaukee Jolt Squeeze Pin Stripper has conveniently located valves, is machined to close tolerances, and is accessible from all three sides. Squeeze head construction insures parallelism between pattern table and platen at all times.

Five sizes available: 12", 14", 16", 19" and 21" diameter squeeze pistons. For complete information on this modern, versatile, triple-duty molding machine, write for descriptive bulletin No. 110.

MILWAUKEE FOUNDRY EQUIPMENT CO.

238 WEST PIERCE STREET • Cable Address "MILMOLDCO" • MILWAUKEE, WISCONSIN

First Consideration Wherever Men Talk Leg Protection

—"FRANK" LEGGINGS

No. 500

BACKED BY 20 YEARS EXPERIENCE

Designed for comfort as well as safety, "FRANK" Leggings are ideal for foundry use, welding, sandblasting and similar hazardous jobs.

"FRANK" Leggings (No. 500 illustrated) have many features that assure exceptional durability and unexcelled service everywhere. . . . They are made without stiff steel springs. . . . There are adjustments for six different leg sizes at the top and two at the bottom. . . . Only No. 1 Chrome Leather is used. . . . Made with double weight leather flares over toes. . . . Seams are double sewn and riveted at points of greatest wear. Other available materials include asbestos, neoprene coated and fireproofed duck. . . . Also made in hip and ankle lengths. . . . A style and material for every purpose.

Standard equipment in hundreds of foundries, "FRANK" Leggings are the last word in safety, comfort and simplicity.

SEND THE CATALOG NO. 45 WITH COMPLETE INFORMATION ABOUT LEGGINGS AND OTHER SAFETY CLOTHING AND DEVICES.

INDUSTRIAL SAFETY EQUIPMENT ASSOCIATION

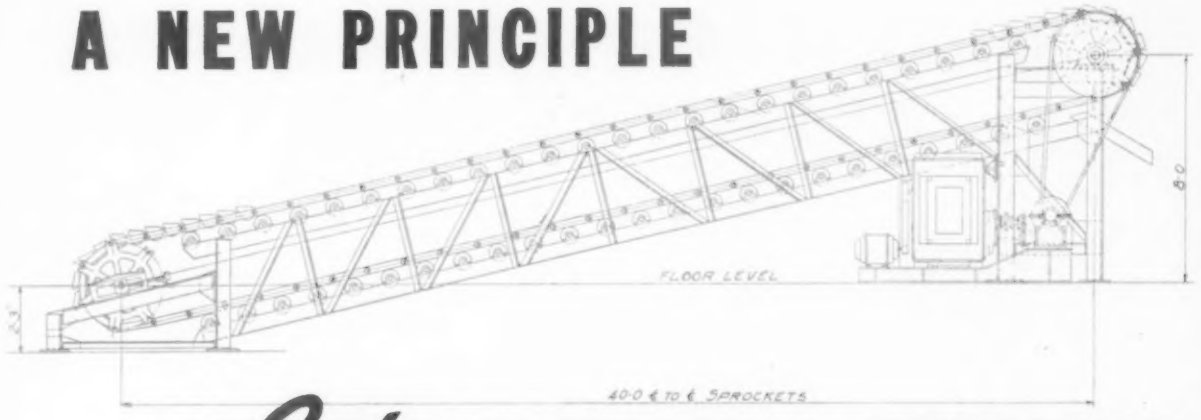
DEFEAT THE AXIS
BUY MORE WAR BONDS

SAFETY *Clothing and Equipment* **CO.**

7016 EUCLID AVENUE · CLEVELAND, OHIO

Phone Endicott 1722

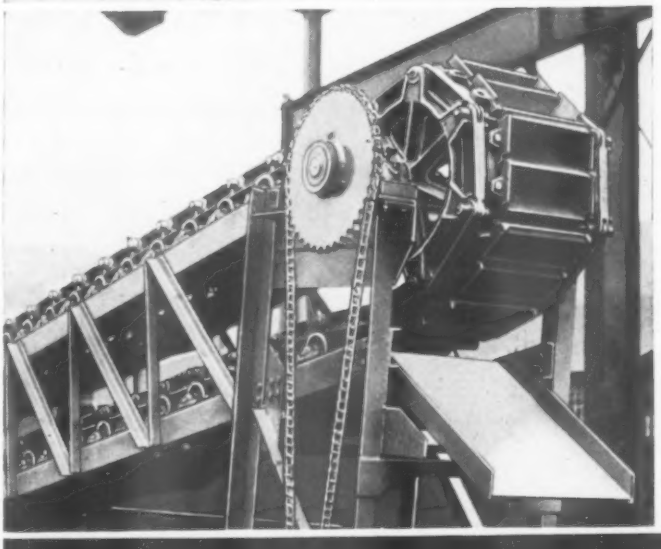
A NEW PRINCIPLE



Cuts FOUNDRY PIG CASTING COSTS!

See following pages for complete data.

the BAILEY *40 FOOT* STATIONARY WHEEL PIG CASTING MACHINE (PATENTED)



No more traveling wheels . . . but stationary, roller-bearing, idler wheels support the new Bailey 15" link mold-chain, which has only half as many moving parts . . . one-quarter as many points of wear. Special high manganese steel pins and bushing in the links take all the wear . . . are quickly replaceable when necessary . . . and because there is no friction except when the links are passing over the sprockets, motion and wear is minimized.

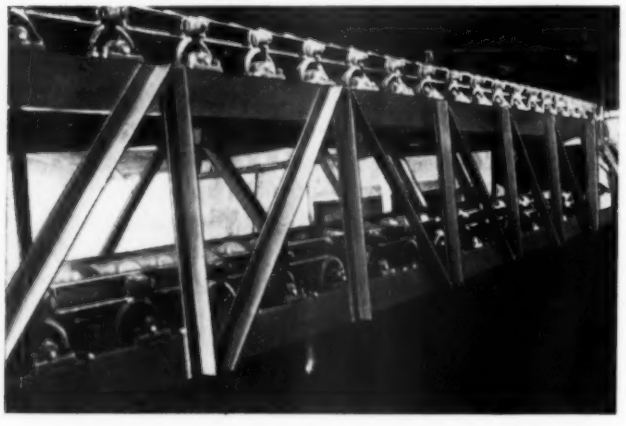
Every feature of the Bailey Stationary Wheel Pig Casting Machine is designed to give maximum speed and flexibility in casting, long continuous service under top-speed operating conditions of 5 to 20 tons per hour and an absolute minimum of maintenance.

Have a Bailey Engineer furnish further facts!

WILLIAM M. BAILEY COMPANY *Engineers* PITTSBURGH, PENNSYLVANIA

THE BAILEY 40 FOOT STATIONARY WHEEL PIG CASTING MACHINE

THE BAILEY 40 FOOT STATIONARY WHEEL PIG CASTING MACHINE, especially constructed for Foundry Pig Casting, eliminates the high maintenance and repair costs and the expensive delays which are characteristic of the traveling wheel type Pig Casting Machine. Every detail and part has been designed and used to produce a machine that will give long life under the most severe operating conditions. Special features are embodied throughout in order to eliminate break-downs and to assure getting the maximum service out of every part. The wheels are mounted stationary and the chain travels over their top. The wheels, being located a maximum distance from the hot moulds, are not subjected to the heat as in other machines and are equipped with roller bearings and grease seals with adequate provision for regular lubrication. Lubrication of the bearings with a grease gun is easily performed about once a week.



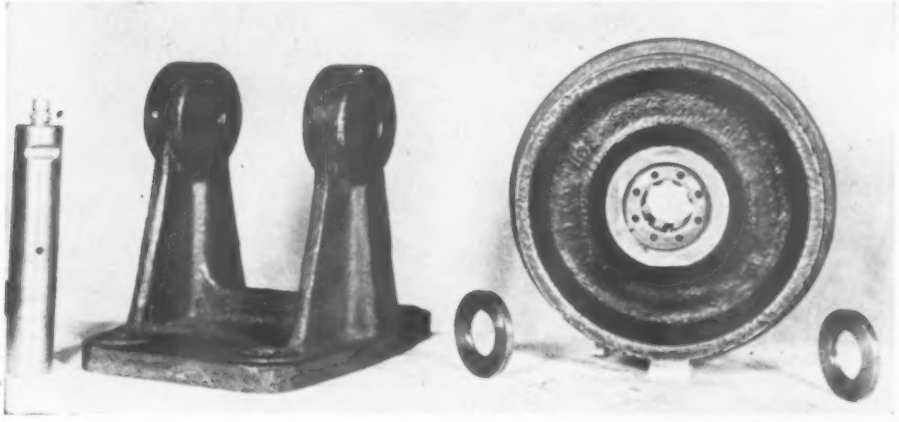
Bailey links, bushings and pins are interchangeable

The chain links are 15″ long and of rugged channel shape design, equipped with replaceable high manganese steel bushings and pins. Wear is confined entirely to the bushings and pins and both are easily and inexpensively replaced. Actually, wear of pins and bushings is negligible, since there is no motion of the pins in the bushings on the straight run of the chains, but only when going over the head and tail sprockets.

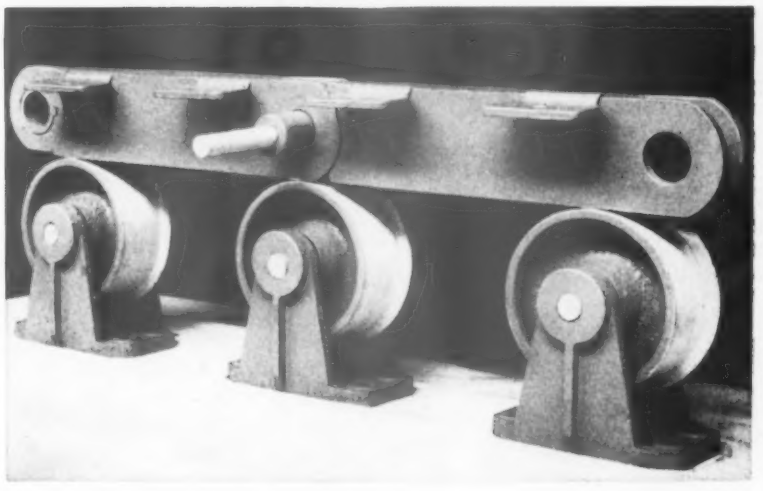
The head and tail sprockets are 3 feet in diameter so that the chains run smoothly and easily, even at the higher speeds. The sprockets are of the double tooth type; the sprocket teeth engage the link pins at both ends of the pin on each side of the link. This prevents any deflection in the direction of the chains as they travel over the sprocket wheels. The chains are kept in correct alignment by spacer rods which pass through the link pins at each link.

WILLIAM M. BAILEY COMPANY • PITTSBURGH 22, PA.

BAILEY STATIONARY WHEEL PIG CASTING MACHINE



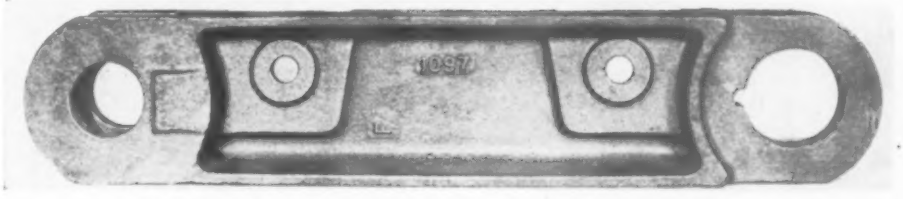
The wheels are mounted in stationary individual bracket stands and are equipped with roller bearings and grease seals, with provision for regular lubrication. These one flange wheels are 7 inches tread diameter, the tread being true and concentric with the bore. The large diameter of the wheel presents greater heat radiating surface which effectively protects the roller bearing and its lubricant from any undue temperature. The wheel and bracket stand assemblies are spaced at 15 inch centers along the strand.



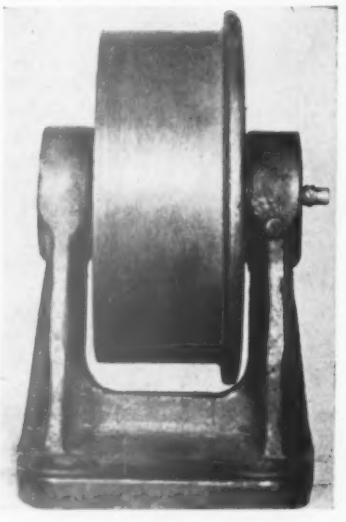
Inside view of chain links as they ride on 7″ wheels; lugs for carrying moulds, bushing, pin and spacer rod in position.

The chains are kept in alignment by spacer rods, which pass through the link pins at each link.

STEEL CASTING LINKS



The Chain is made up of Links, Pins and Bushings. The links are a rugged steel casting channel section, heat treated, 15″ from center to center. Every link is equipped with two mould supports. The bushings are 14% manganese steel keyed into male end of link. The pins are 14% manganese steel with square heads, which prevents twisting in female end of links.



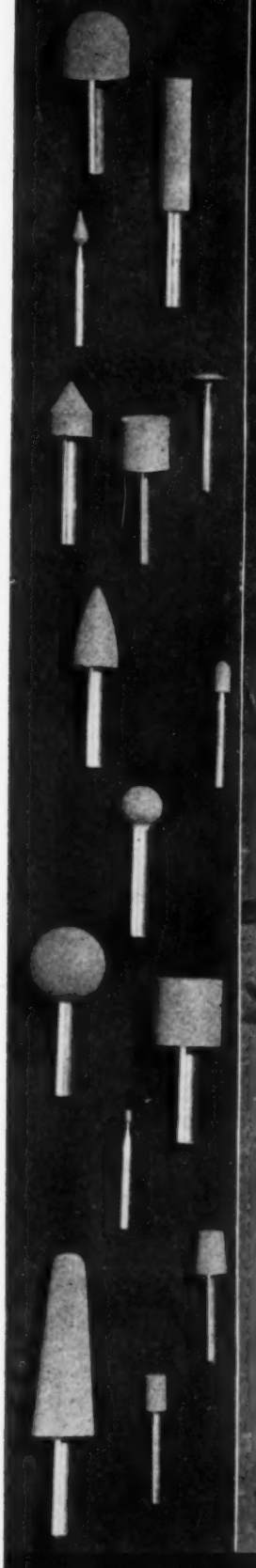
All wear confined entirely to bushings and pins.
All links, bushings and pins are interchangeable.

The simplicity of design, quality and ruggedness of materials, the lack of rolling friction and the solid individual mounting guarantee a low operating cost.

Less than one-fourth the moving and wearing parts than any other design of Pig Casting Machine.

WILLIAM M. BAILEY COMPANY • PITTSBURGH 22, PA.

For Grinding the Light Metals . . .



NORTON MOUNTED POINTS and WHEELS

THE cleaning of these aluminum alloy castings at Sperry Gyroscope Company, Brooklyn, is typical of thousands of new wartime grinding jobs on the light metals.

The castings must be cleaned thoroughly, even in the hard-to-get-at corners. They must be cleaned speedily for there can be no bottlenecks in the production of the important device of which they are a part.

There are Norton Mounted Wheels and Points that have been especially developed for quickly grinding aluminum and magnesium—wheels of Crystolon abrasive, vitrified bonded and with a special filler treatment to prevent loading.

Catalog 43-F lists the nearly 200 sizes and shapes of Norton Mounted Points and Wheels.

NORTON COMPANY
Worcester 6, Mass.

Distributors in All Principal Cities

NORTON ABRASIVES

W-940

KEEP THIS EXPERT FOUNDRYMAN

Always at Your Elbow

● He is an *EXPERT* foundryman—in every sense of the word. He has the technical training of a metallurgist. But he also has the broad and valuable experience that can be acquired only through actual work in foundries of all kinds and sizes.

He is the Republic Pig Iron Metallurgist—the fellow who is "always at the elbow" of scores of foundry managers who are seeking new and better ways of doing things.

In some foundries his problem has been to improve quality—in others to increase production, cut costs or eliminate troublesome "bugs" in operations. He may be able to help you. Why not find out—by asking us to send him at your convenience? There will be no obligation whatever.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • • CLEVELAND 1, OHIO
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York 17, N. Y.

Republic

PIG IRON

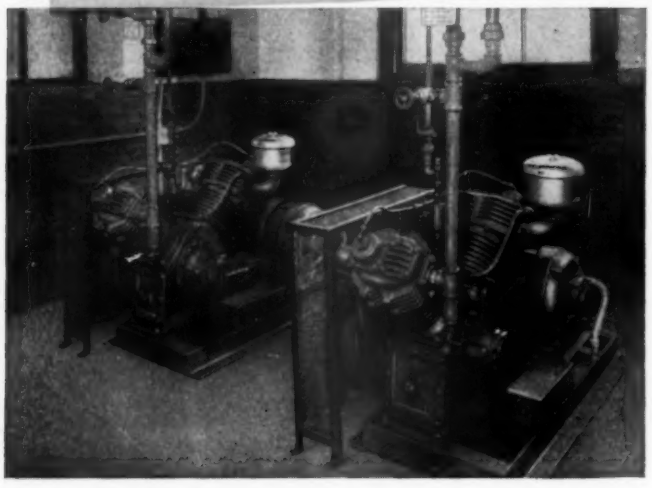
ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

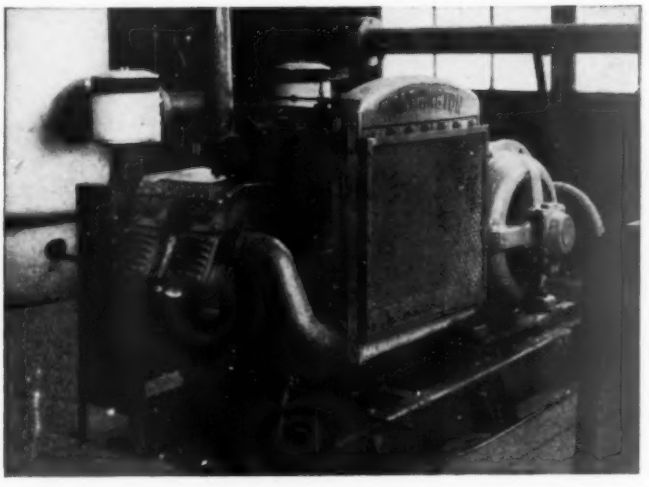
"CHATEAUGAY"
Low-Phosphorus, Copper-Free
"REPUBLIC"
(Northern)
Foundry, Basic and Malleable
"PIONEER"
(Southern)
Foundry and Basic

COMPRESSED AIR . . . WHERE YOU WANT IT . . . WHEN YOU WANT IT . . .

WORTHINGTON RADIAL TYPE AIR-COOLED UNITS

READILY PLACED CLOSE TO POINTS WHERE AIR IS NEEDED





Do your expanded activities call for additional compressed air . . . or for air at locations not served by your present equipment? In either case, consider these points in favor of Worthington radial type units:

AIR-COOLED . . . No water piping to install or maintain.

PORTABILITY . . . No foundation required. Can be set up quickly at any convenient place, and moved easily to meet changing needs.

COMPACTNESS . . . Minimum floor space requirements.

RELIABILITY . . . Incorporate the same basic design features as in the larger Worthington compressors . . . assuring years of uninterrupted operation at high efficiency.

District Office Engineers and our Authorized Dealer, in your territory, are ready to assist in selecting the correct type and size of compressor for your particular requirements.

WRITE FOR BULLETIN H-620-B16F.

AC3-S

WORTHINGTON FEATURES

- **FEATHER VALVES.** Considered by leading engineers as the simplest, lightest and most efficient valves ever developed for compressor service.
- **AIRPLANE TYPE CONNECTING RODS.** With balanced radial design, all rods connect to single crankpin bearing, held rigid by four bolts.
- **FORCE-FEED LUBRICATION TO CRANKPIN AND WRISTPIN BEARINGS.** Only filter-cleaned oil reaches bearing surfaces. Saves 50% to 75% of lubrication cost, and extends compressor life by reducing bearing and cylinder wear.
- **FORCED-DRAFT AIR COOLING.** Effectively cools the cylinder heads where greatest heat is generated, thus increasing efficiency. All cylinders are isolated for maximum heat radiation.

TYPICAL USES

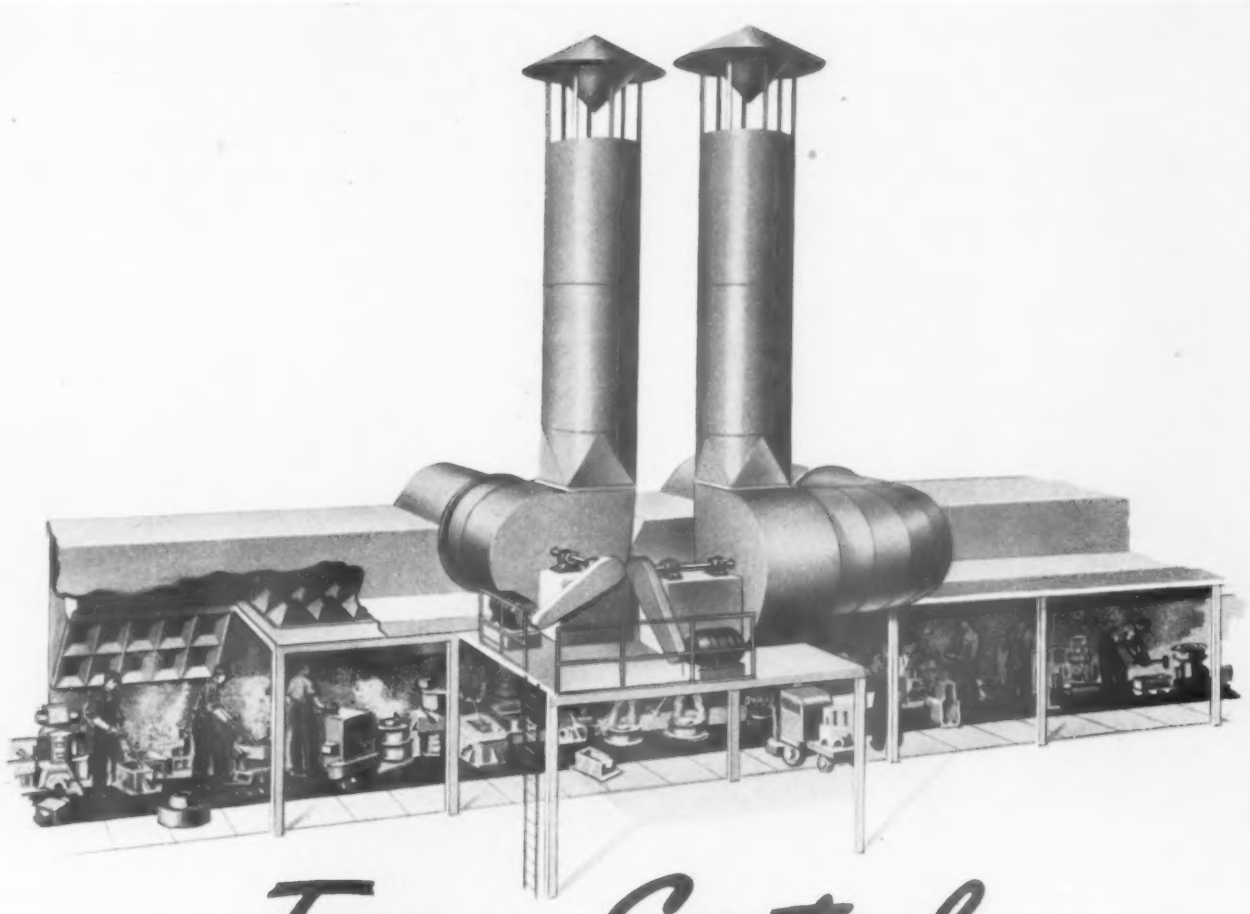
Light sand blasting—cleaning boiler tubes—paint spraying—metal spraying—operating air tools and rock drills—semi-portable underground service—operating pressers — train charging—displacing acids and chemicals—stone cutting — general industrial service

WORTHINGTON

RADIAL AIR COMPRESSORS . . . . FOR AIR ANYWHERE

CAPACITIES: 83 TO 445 CU. FT. PER MIN. PRESSURES: 80 TO 125 LB. PER SQ. IN.

WORTHINGTON PUMP AND MACHINERY CORPORATION • HARRISON, NEW JERSEY



Fume Control
for aluminum and magnesium foundries

● The fumes and smoke resulting from knocking cores out of aluminum and magnesium castings can be collected and positively removed from the building with Bartlett-Snow Fume Control equipment. As illustrated in the cutaway view above, these systems consist of groups of Bartlett-Snow's highly efficient pyramidal shaped collecting orifices (U. S. Pat. 121,704, July 30, 1940) mounted along the backwall and in a canopy which extends out beyond the knockout grating.

Castings to be knocked out are dumped on the grating from an industrial truck. The broken cores are dropped through the grating to a collecting hopper. The fumes and smoke, steam and dust are drawn off through the orifices. The men work in a clean cool air stream—seldom come into contact with even faint traces of smoke or fumes,—and have practically no restriction in their work.

Our recently completed 40-page Foundry Bulletin No. 91 illustrates many different types and applications of Bartlett-Snow Foundry Equipment,—and contains much information of interest to every foundryman. Send for a copy today!

THE C. O. BARTLETT & SNOW CO.

6201 HARVARD AVE. • CLEVELAND, OHIO

Engineering and Sales Representatives in the Principal Cities

FOUNDRY SAND, MOLD AND CASTINGS HANDLING • • DUST AND FUME CONTROL SYSTEMS • •

Brands:
Buffalo
Detroit
Susquehanna

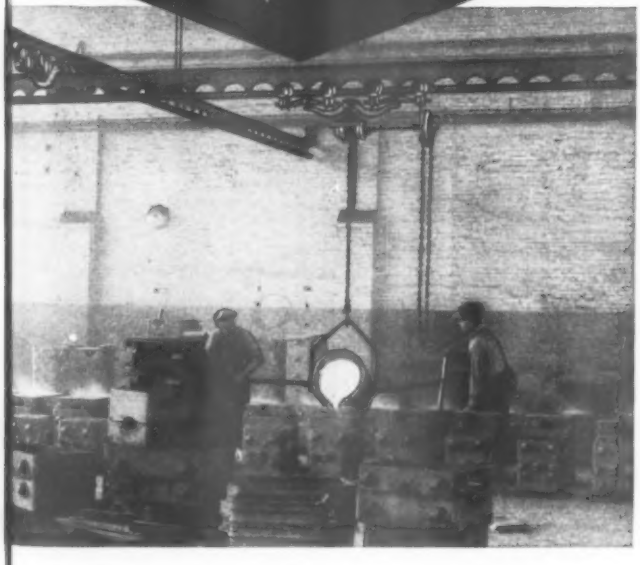
Grades:
Basic
Foundry
Malleable
Ferro-Silicon
Silvery

NATIONAL STEEL CORPORATION

THE HANNA FURNACE CORPORATION
BUFFALO DETROIT NEW YORK PHILADELPHIA BOSTON

Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION
Executive Offices: PITTSBURGH, PA.

DIRECT FROM CUPOLA TO MOLD...



EASY... SAFE... No Rehandling!

Foundries from the largest to the smallest are profiting from installations of Cleveland Tramrail overhead materials handling equipment. Output per man is stepped up, safety promoted and costs cut.

Because floor obstructions do not hinder the operation of Cleveland Tramrail, hot metal can be taken directly from cupola to mold without rehandling. As a result travel time is reduced and heat loss of metal is held at a minimum.

The overhead equipment is also advantageous in the handling of molds, transporting finished castings and scrap, changing cupolas, etc.

Regardless of the priority you can furnish, get information on Cleveland Tramrail now and study the possibilities of modernizing your foundry methods.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE. OHIO.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

HAYNES *equipment*

BRASS FURNACES

Tilting or stationary. Simple cover lifting mechanism, 2" cold rolled shaft, cast steel cross head, 3/8" rods and turnbuckles for adjusting cover. Made in any size required. 6" machined trunnions rest in chilled face bearings in the legs which are bolted to channel iron base braced with steel bars to eliminate side motion. Gear box and gears adjustable to take up any loose play due to wear. Furnace is complete welded shell equipped with special Haynes burner designed to save nearly one-fourth your oil. Equipped with a General Blower unit.

JOLT SQUEEZER

This machine has a 10" squeeze cylinder, 3" jolt cylinder, 17" x 20" jolt table. Sturdily built throughout—no bolts or screws. Post and jolt cylinder cast on one piece. Arm swings on 2-7/16" cold rolled shaft. Zerk fittings on all moving parts. Comes completely equipped with vibrator, riddle rack, set-off board, air gauge, pop off gauge and pin for gate horn.

TUMBLING BARRELS

This new tumbling mill is equipped with a new lid device which fastens over each end of the lid and is provided with tightening screws which hold the lid in place and keep it from warping. This mill has a 1" shell, is heavily built throughout for long service and rough usage and can be furnished in the following sizes:

36" x 40"—36" x 48"—36" x 56"—36" x 66"—36" x 73"

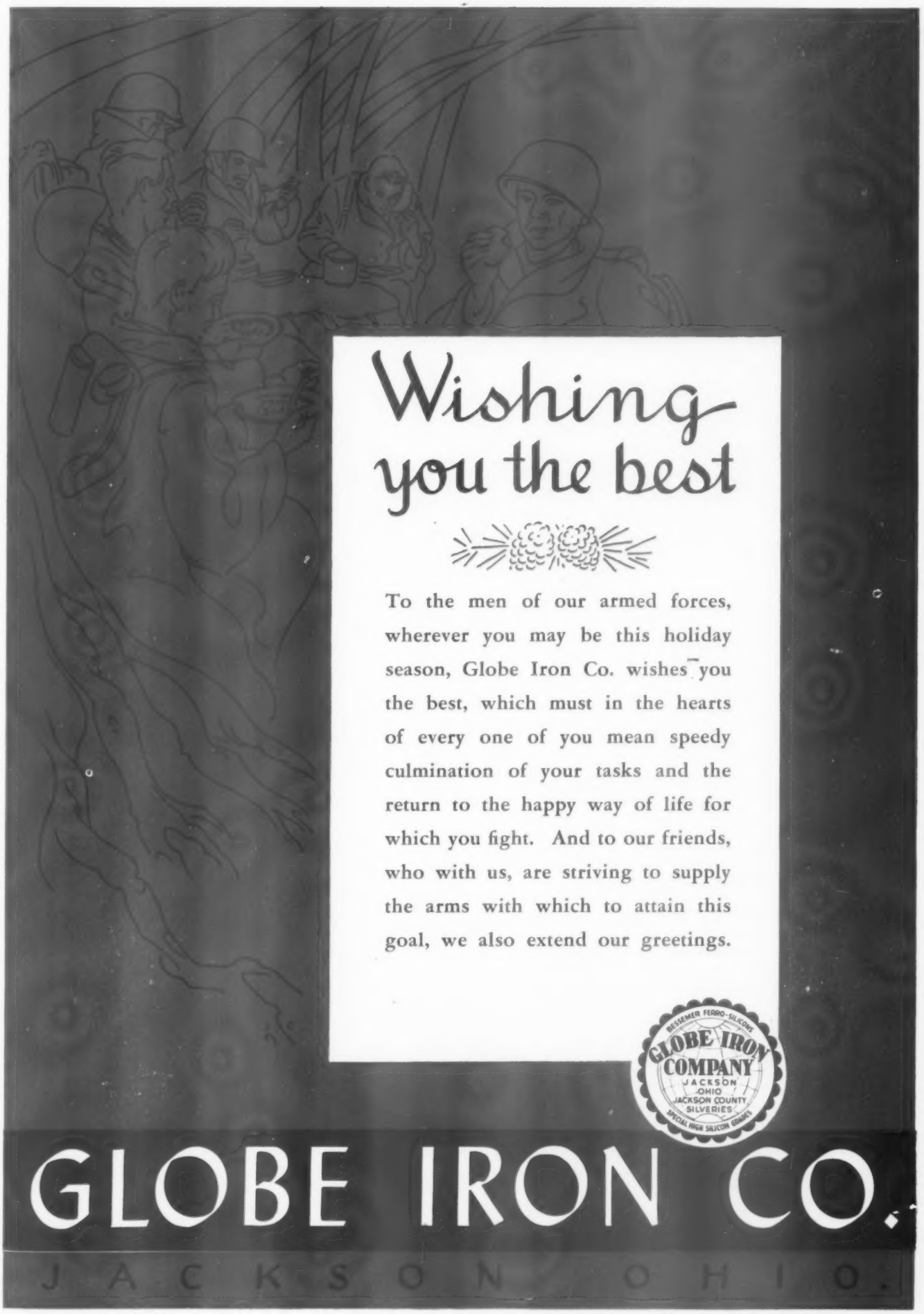
CORE OVENS

The Haynes Core Oven has 2" insulated walls. Front, top and bottom pressed steel eliminating breakage. Cast iron fire box for Coke, Oil or Gas. Five rolling shelves, one 10" high and four 7" high. Shelves make complete half turn closing oven while shelves are being loaded. Height 51", width 54", greatest depth of shell 27". Weight approximately 900 lbs. Firebox height 16", depth 15", width 14".

Send for detailed information and prices. Prompt deliveries.

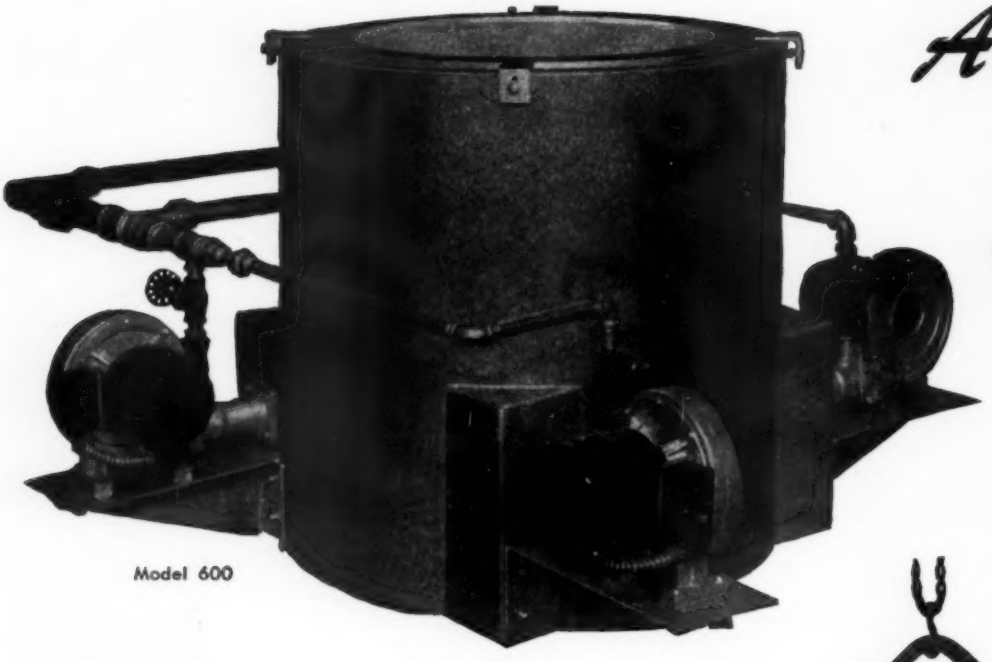
HAYNES FOUNDRY EQUIPMENT CO.

1734 LAKE STREET PHONE 7805 KALAMAZOO 21, MICH.


Wishing you the best
To the men of our armed forces, wherever you may be this holiday season, Globe Iron Co. wishes you the best, which must in the hearts of every one of you mean speedy culmination of your tasks and the return to the happy way of life for which you fight. And to our friends, who with us, are striving to supply the arms with which to attain this goal, we also extend our greetings.
BESSEMER FERRO-SILICONS
GLOBE IRON COMPANY
JACKSON
OHIO
JACKSON COUNTY
SILVERIES
SPECIAL HIGH SILICON GRADES
GLOBE IRON CO.
JACKSON OHIO

600 *Pounds of Melted Aluminum in 60 Minutes*

(A Customer's Report



Model 600

The Master Model 600 Aluminum Melting Furnace was built to produce uniform heats at low operating and upkeep cost and for accessible pouring, either a full pot or dipping out with small ladle.

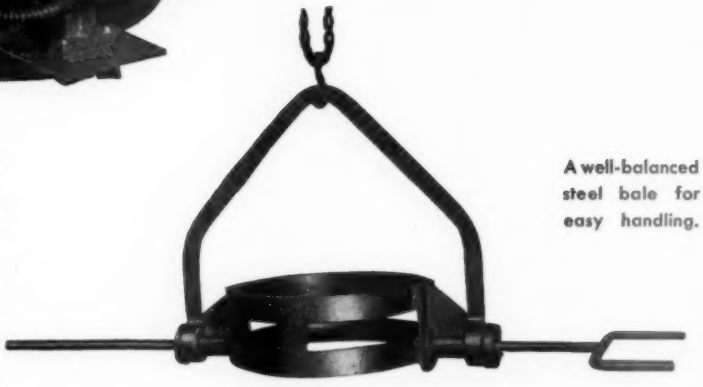
The unique 4 burner and blower arrangement creates a whirlpool of heat, distributing it evenly over the pot surface to produce speedy uniform melting. The furnace is so designed that it can be lowered into the floor to convenient working height.

The Master Model 600 will do your aluminum melting job speedily, efficiently, and at low cost. Write for full specifications and prices.

OTHER MODELS

100 Pound Capacity	Two 50 Pound Pots	Dual Burner
60 Pound Capacity	Two 30 Pound Pots	Dual Burner
50 Pound Capacity	One 50 Pound Pot	Single Burner
30 Pound Capacity	One 30 Pound Pot	Single Burner

Furnished with either gas or oil burning equipment



A well-balanced steel bale for easy handling.

Alloy cast iron pot with pouring lips on two sides.

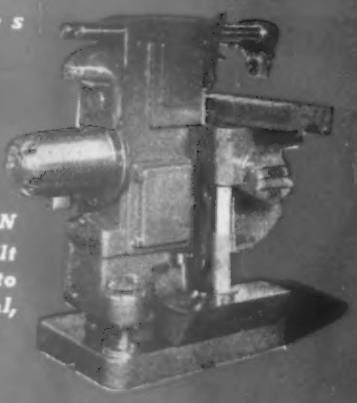
Eye bolts built in. The pot walls are 3/4" thick. Pot capacity 500 pounds of aluminum. Pot i slifted from furnace by crane and set into bale for pouring.

THE KINDT-COLLINS COMPANY

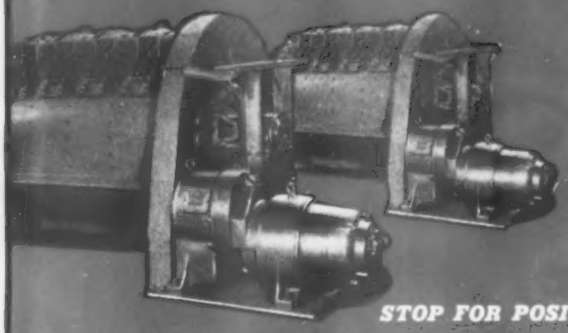
"EVERYTHING FOR THE PATTERN SHOP"

12653 ELMWOOD AVENUE ★ CLEVELAND, OHIO

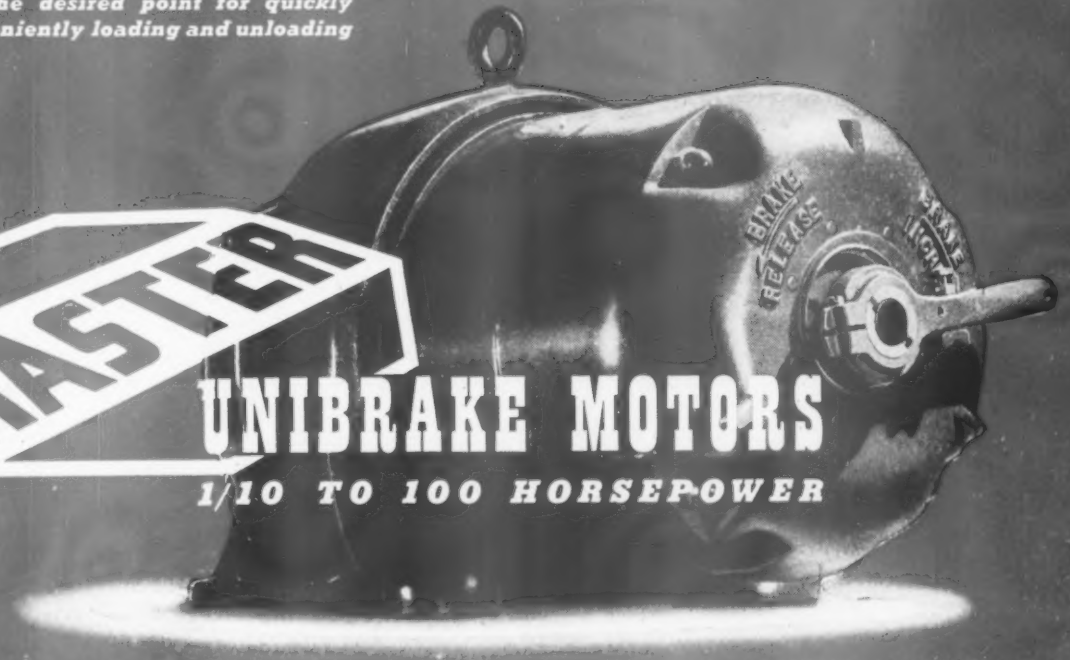
BUY UNITED STATES WAR BONDS AND STAMPS



SIMPLE COMPACT DESIGN
The electric brake is built into the motor end cover to form a compact, economical, easy to use unit.



STOP FOR POSITION
Stop at the desired point for quickly and conveniently loading and unloading

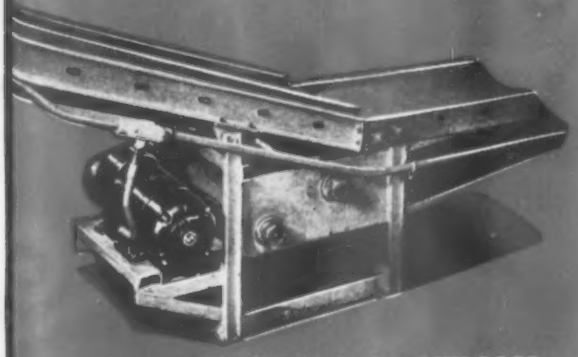


MASTER

UNIBRAKE MOTORS

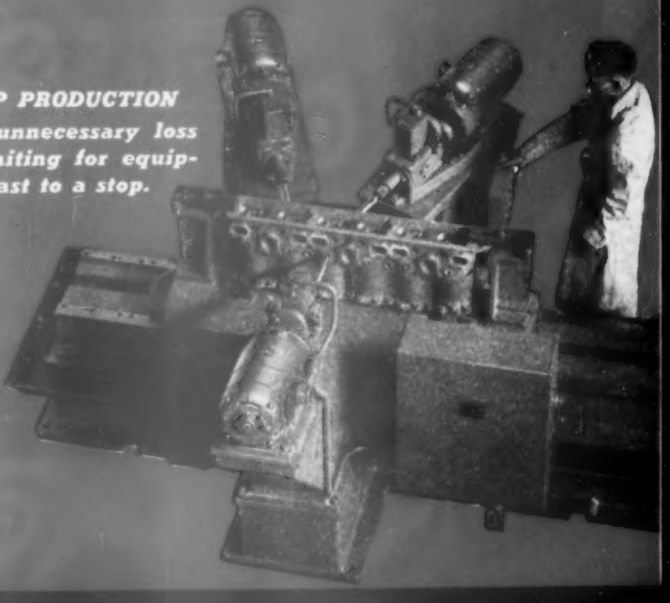
1/10 TO 100 HORSEPOWER

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

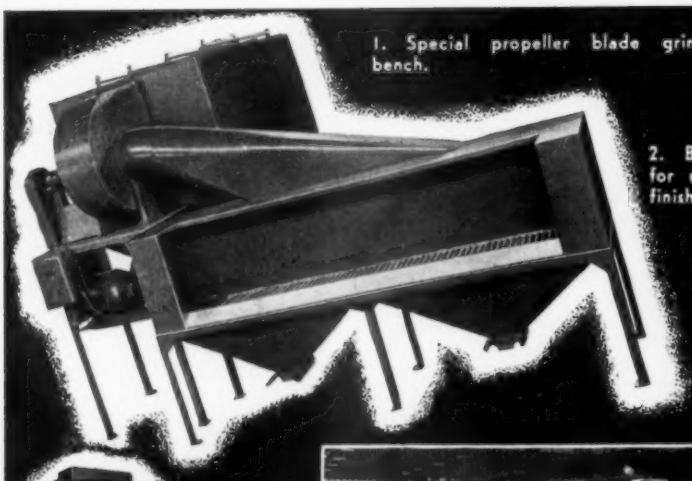


STOP AND HOLD ANY LOAD
Unibrake motors are very advantageous on hoists, elevators, inclined conveyors, etc....

SPEED UP PRODUCTION
Eliminate unnecessary loss of time waiting for equipment to coast to a stop.



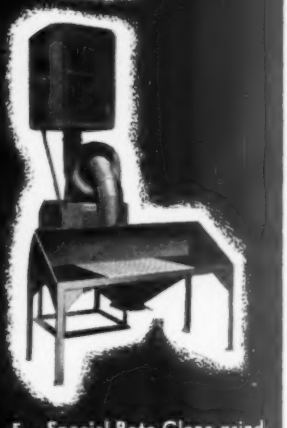
1. Special propeller blade grinding bench.



2. Booth type bench for magnesium casting finishing.

3. Finish grinding bench for small parts—equipped with filter after-cleaner.

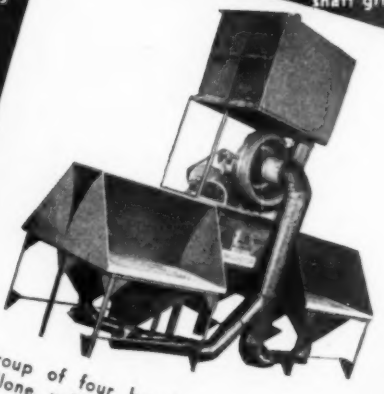
4. Production line of Type N Roto-Clone booth-type benches for grinding and burring magnesium castings.



5. Special Roto-Clone grinding bench with filter after-cleaner for flexible shaft grinding.

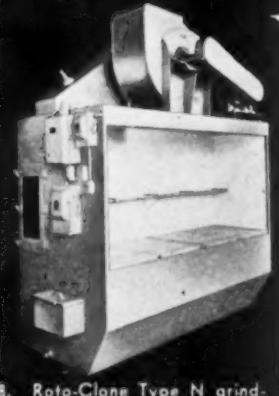
6. Propeller blade grinding and polishing bench with filter after-cleaner.

AAF
AMERICAN AIR FILTERS



7. Group of four benches served by single Roto-Clone unit with after-cleaner for small parts burring.

When requesting information on these special Roto-Clone benches, please identify them by number.



8. Roto-Clone Type N grinding bench for large magnesium castings.

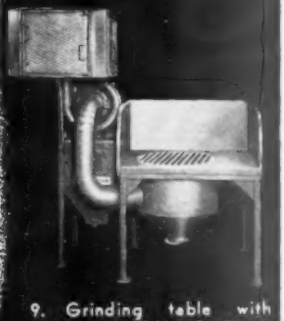
ROTO-CLONE

Dust Control

GRINDING BENCHES SPEED PRODUCTION

Shown on this page are some of the special AAF Roto-Clone grinding benches designed to meet specific needs in war production plants. Complete information on each will be sent on request.

AMERICAN AIR FILTER COMPANY, INC.
266 Central Avenue INCORPORATED **Louisville, Ky.**
In Canada: Darling Bros., Ltd., Montreal, P. Q.



9. Grinding table with rotating grill to facilitate working.

X-Ray on wheels

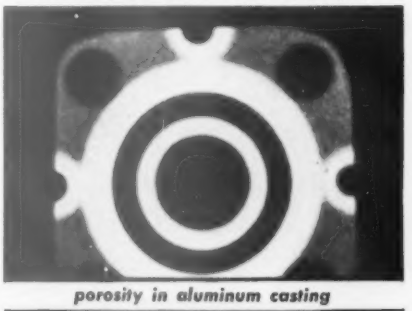
this powerful Mobile 150 KVP X-Ray Unit brings non-destructive x-ray inspection to any part of your plant.

"ON THE SPOT" RADIOGRAPHY The Picker 150 KV Mobile Unit brings comprehensive facilities for X-Ray inspection directly to any point of production in your plant.

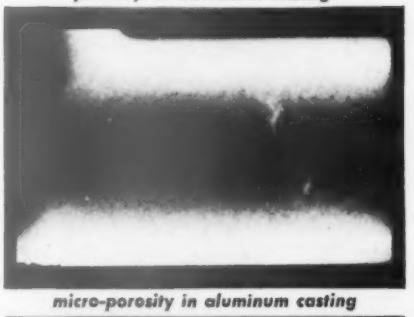
This compact, powerful, easily transportable apparatus fulfills every requirement for production inspection or spot checking of many diverse materials . . . metals, plastics, fabric, wood. Completely self-contained, requiring only a current source, the Picker 150 KV Mobile Unit provides positively controlled voltages from 15 KV to 150 KVP, with a radiographic capacity (with screens) up to 1½" of steel and 7" of aluminum. The rapidity of exposures ideally adapts this Unit to consecutive production inspection.

Write today for our bulletin on the Picker 150 KV apparatus, which gives details of construction, capacities and applications. Our engineering staff and research bureau is at your service for the study of any special problems concerning non-destructive radiographic examination.

Some typical examples of defects disclosed by non-destructive radiography

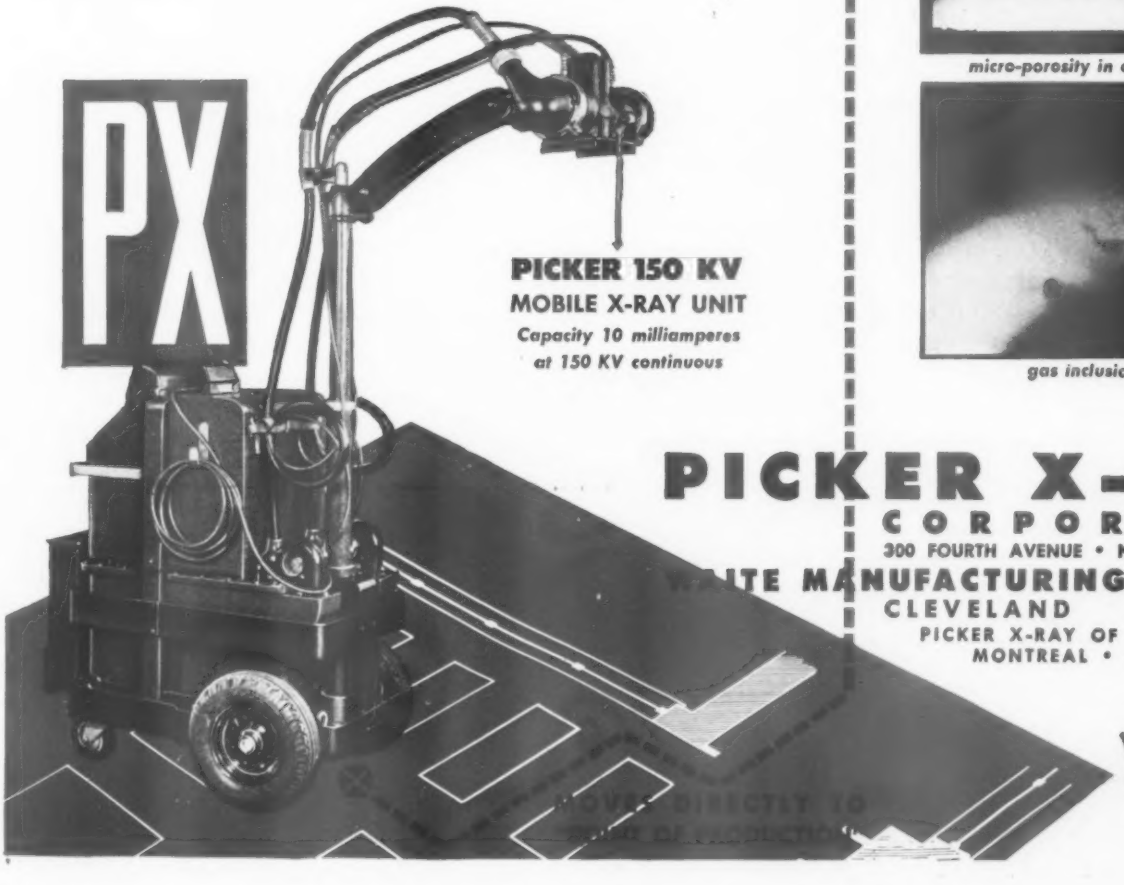


porosity in aluminum casting



micro-porosity in aluminum casting

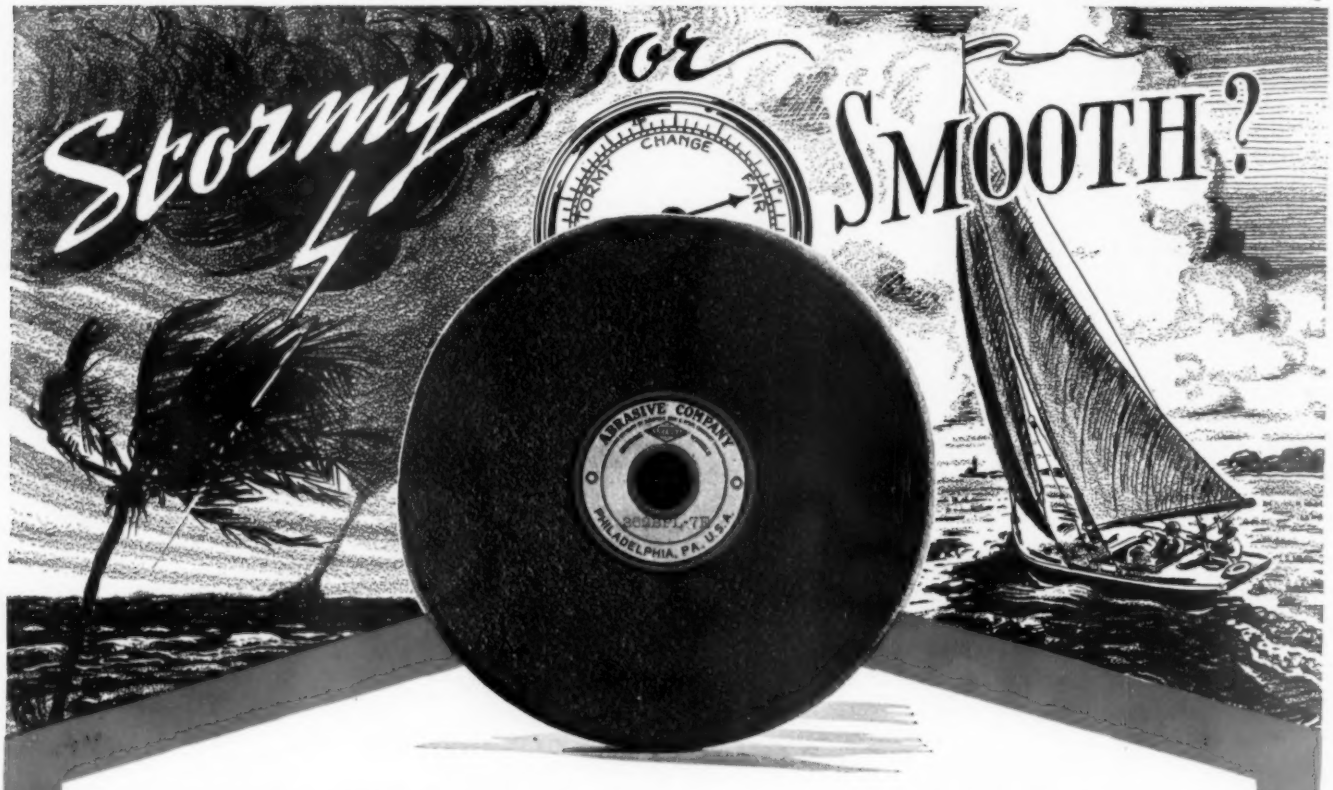
gas inclusion in steel



PICKER 150 KV
MOBILE X-RAY UNIT
Capacity 10 milliamperes at 150 KV continuous

PICKER X-RAY CORPORATION
300 FOURTH AVENUE • NEW YORK 10, N. Y.
WAITE MANUFACTURING DIVISION
CLEVELAND • OHIO
PICKER X-RAY OF CANADA, LTD.
MONTREAL • TORONTO

First "E" Award in the X-Ray Industry



STEER CLEAR OF PRODUCTION "SQUALLS"

BY USING

ABRASIVE COMPANY GRINDING WHEELS

Today's production pace *demands* "smooth sailing" in every grinding operation. On some jobs this means SPEED in removing stock. On others, COOL ACTION for tool sharpening. Still others, ACCURACY in obtaining fine finish.

But whether it's snagging, tool and cutter, surfacing, internal, cylindrical, centerless or general purpose grinding, "ABRASIVE" makes a wheel that can help to steer your "Production Ship" smoothly and speedily into port.

"ABRASIVE" QUALITY—Tested in Action and Proved by Performance—is *your assurance* of extraordinary efficiency and economy on the job. Abrasive Company wheels are their own proof of superiority. Why not let them prove it to YOU? An "Abrasive" Engineer stands ready to assist you with your grinding problems. Your inquiry will receive prompt attention.

TRADE ABRASIVE MARK

OVER HALF A CENTURY OF ABRASIVE SERVICE TO THE NATION

ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

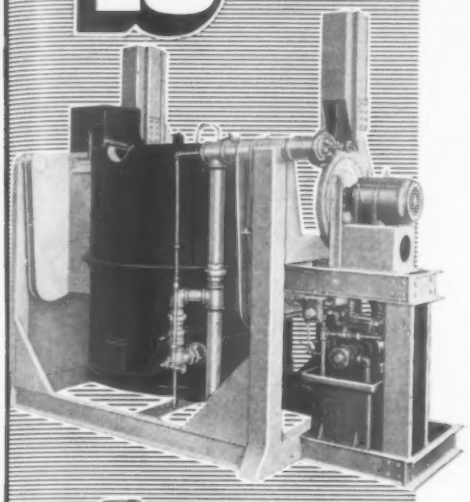
TACONY & FRALEY STS., PHILADELPHIA, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

1892 **1943**

STROMAN

The Last Word in Melting Furnaces

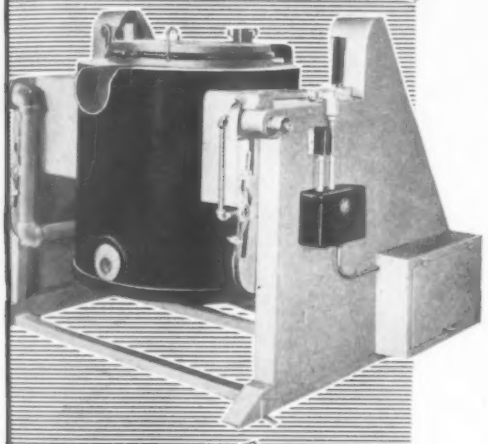
FOR BRASS, BRONZE, ALUMINUM, MAGNESIUM AND ALL OTHER NON-FERROUS METALS



HYDRAULIC TILTING FURNACES

FOR ALUMINUM AND MAGNESIUM
Capacities: Aluminum 500 to 3000 lbs. — Magnesium 350 to 2000 lbs.

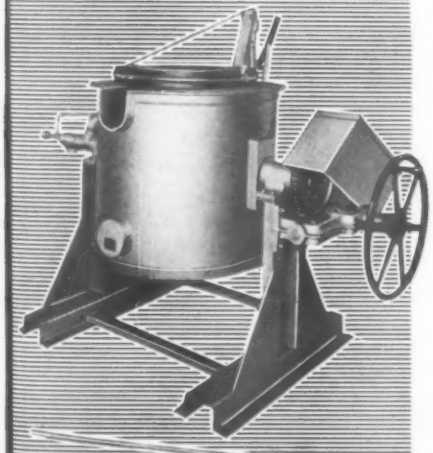
These furnaces combine every known furnace innovation, to assure fastest, safest and most economical production. Hydraulic Tilt is the safest, smoothest, easiest to operate and greatest metal saving manner of pouring . . . Stationary Lip Pour, another feature, allows ladle to remain in the same position during entire pour . . . Variable Speed Pour controls tilting speed as desired by operator . . . Streamline Design conserves floor space . . . Heavy Duty Construction assures longest life. They can be fired by either oil or gas.



CRUCIBLE FURNACES . . . MECHANICAL TILTING

FOR BRASS AND ALUMINUM
Capacities: 450 to 1200 lbs. — Aluminum 150 to 400 lbs.

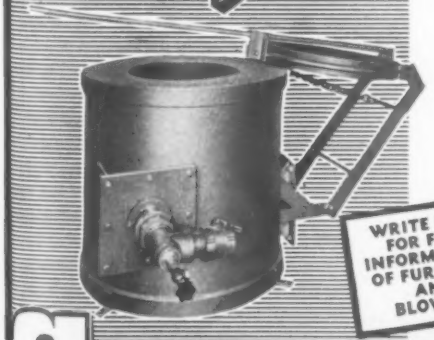
The most advanced furnace of its type. Stationary Lip Pour holds metal spillage to a minimum and speeds production . . . Electric Tilt is finger-tip controlled . . . New Push-Back Cover is easiest and safest to operate . . . Oil or gas fired in conjunction with Stroman Blowers they are most economical in fuel costs . . . Safety features are many and exclusive with Stroman Furnaces.



MANUAL TILTING FURNACES

FOR BRASS, BRONZE AND ALUMINUM
Capacities: from No. 40 to 400 Crucible

The "Old Standby's" with the rugged construction that has proved that these furnaces can "take it" in many of the leading foundries the country over. Redesigned to eliminate old style massiveness without sacrificing strength or rigidity anywhere, this is a more popular furnace than ever. Tilt mechanism is hand wheel, easy to operate, swing cover is extremely easy to open and close. Oil or gas fired as desired. All sizes from 40 to 400 CRUCIBLES.

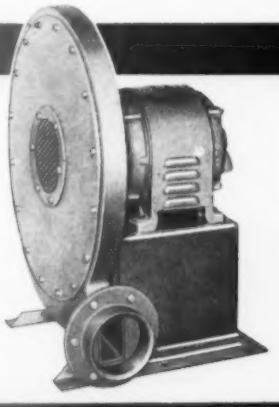


CRUCIBLE STATIONARY FURNACES

FOR BRASS, BRONZE, ALUMINUM AND OTHER NON-FERROUS METALS
Capacities: from No. 20 to 400 Crucible

Sturdy, efficient, time saving, these Stroman Furnaces are also most economical in their daily production. Choice is given of three types of covers. The Push-Back which is an exclusive Stroman development and is a great time and labor saving feature . . . is most popular. They are also available with Swing type or Counter-Balanced covers. Oil or Gas fire.

STROMAN CENTRIFUGAL BLOWERS



Combine every feature to make a great blower . . . Uniform Pressure . . . Simplicity of Design . . . Welded Steel Fabrication . . . Permanent Alignment . . . Quiet Operation . . . Compactness. All in all they have many uses in the foundry field and assure you of getting the correct amount of air where you want it when you want it.

WRITE NOW FOR FULL INFORMATION OF FURNACES AND BLOWERS

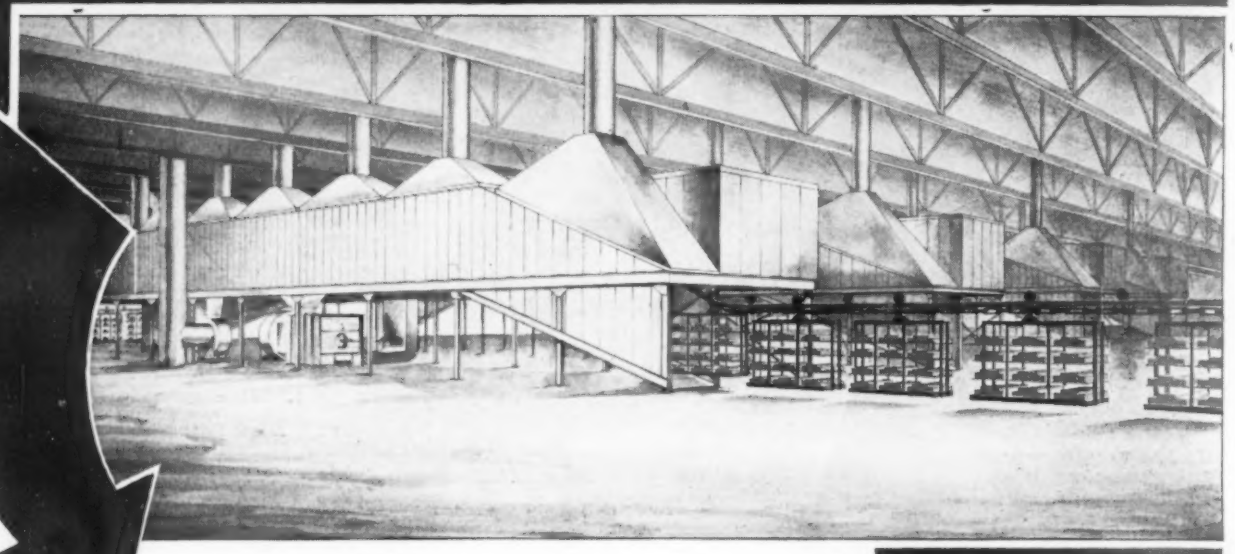
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO

Here's Proof...

OF CARL-MAYER ACHIEVEMENTS IN FOUNDRY OVENS



4 OF THE LARGEST CONTINUOUS MONORAIL CORE OVENS INSTALLED IN U. S. A.

Patents Pending

- *Used for* **ALUMINUM** *and* **MAGNESIUM** *castings*

An installation of this size (each oven 170 feet long and utilizing 1200 feet of conveyor) installed for Ford Motor Co., indicates the confidence industry's leaders place in Carl-Mayer creative engineering and "know-how"!

Whatever your core-baking problem you can depend on Carl-Mayer for the most productive and economical solution.

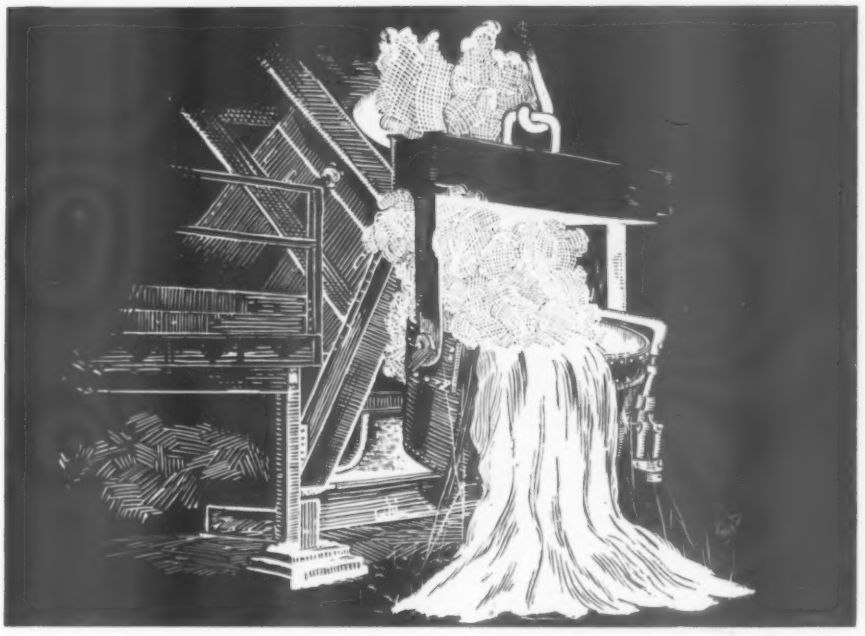
Carl-Mayer Engineers are at your immediate service for a study of your operating conditions and installation estimate. Or, write for Bulletin 141.

OTHER IMPORTANT INSTALLATIONS FOR CONCERNS SUCH AS . . .

Aluminum Co. of America
American Magnesium Corp.
American Radiator & Standard Sanitary Corp.
Babcock & Wilcox Co.
Bucyrus-Erie Co.
Brown Industries Corp.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Frank Foundries Corp.
Fremont Foundry Co.
G & C Foundry Co.
General Motors Corp.
General Electric Co.
General Steel Castings Corp.
Gilbert & Barker Co.
International Heater Co.
Kelsey Co., Inc.
Packard Motor Co.
Shenango Penn Mold Co.
Studebaker Corp.
Whiten Machine Works
Whiting Corp.
A. G. Williams Co.

Carl-Mayer CORE AND MOLD OVENS

THE CARL-MAYER CORPORATION
3030 Euclid Ave., Cleveland, Ohio



NORTON REFRACTORY CEMENTS are giving long, trouble-free service in metal melting furnaces because of their ability to withstand high heat and remain chemically stable. For example:

CRYSTOLON (silicon carbide) 1131 CEMENT — a highly refractory mixture for ramming into oil or gas fired reverberatory and pit furnaces melting aluminum. Also recommended for melting copper and zinc.

RM 1169 CEMENT — a fused magnesia mix, ideal for lining Ajax-Northrup high frequency furnaces melting nickel-chromium alloys. Has given up to 400 heats in 600 to 1000 pound furnaces.

ALUNDUM (electrically fused Al_2O_3) 889 CEMENT — recommended for lining burner tunnels in gas or oil fired billet heating, heat treating and annealing furnaces.

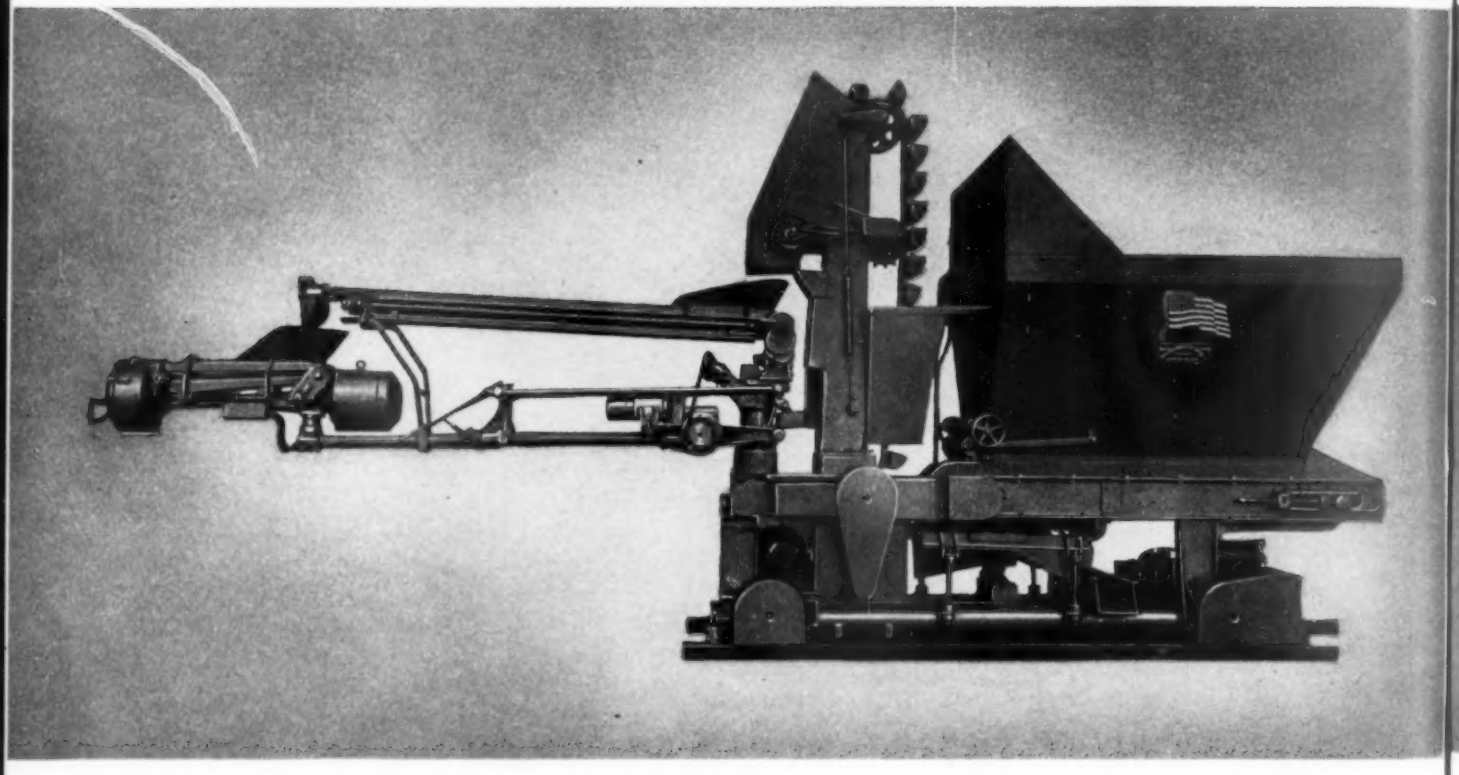
RM 1140 — a fused magnesia cement for rammed linings in Ajax-Wyatt low frequency vertical ring induction furnaces melting high copper alloys (more than 85% copper), copper-nickel alloys, nickel silver, and cadmium bronzes.

R-861

NORTON COMPANY
Worcester 6, Massachusetts

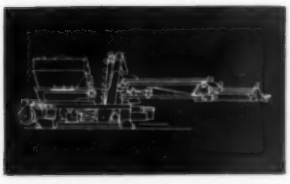
. . . YOU CAN'T BEAT

The Sandslinger

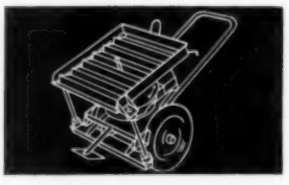


Hundreds upon hundreds of B & P Sandslingers are in daily use ramming molds and cores at high speed and at low cost—saving metal, floor space, direct labor charges, and cleaning time—in jobbing and production shops—for simple and complex castings—with dry or green sand—on all types of work from the smallest to the largest.

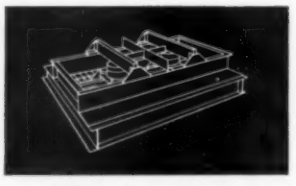
Made in three types—swing, tractor, and motive (shown above)—and in capacities from 7 to 15 cubic feet per minute—Sandslingers can take on your jobs and do them better, at substantial cost saving—give you more and better castings—and broaden your market opportunities. B & P engineers are ready to help you gain these advantages.



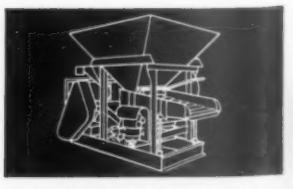
B & P Speedslinger—for fast, low cost, mold production.



B & P Screenerator—cuts, screens, aerates, and piles.



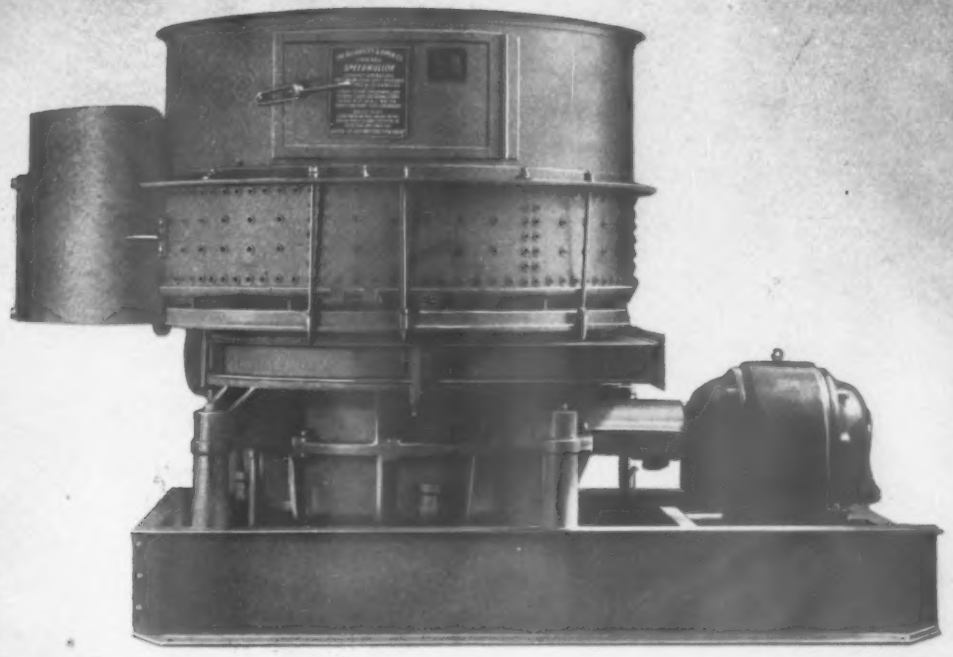
B & P Shake Out—made to suit any shake-out condition.



B & P Sand Conditioner—especially suited for jobbing foundries.

THIS COMBINATION!

The Speedmullor



A batch of sand mulled 4½ times faster than ever before—sand more thoroughly mulled and aerated than ever before—large savings in core oils and binders—sand cooled to within 5 degrees of room temperature in 1½ minutes—that, in brief, is what you will get from a B & P Speedmullor.

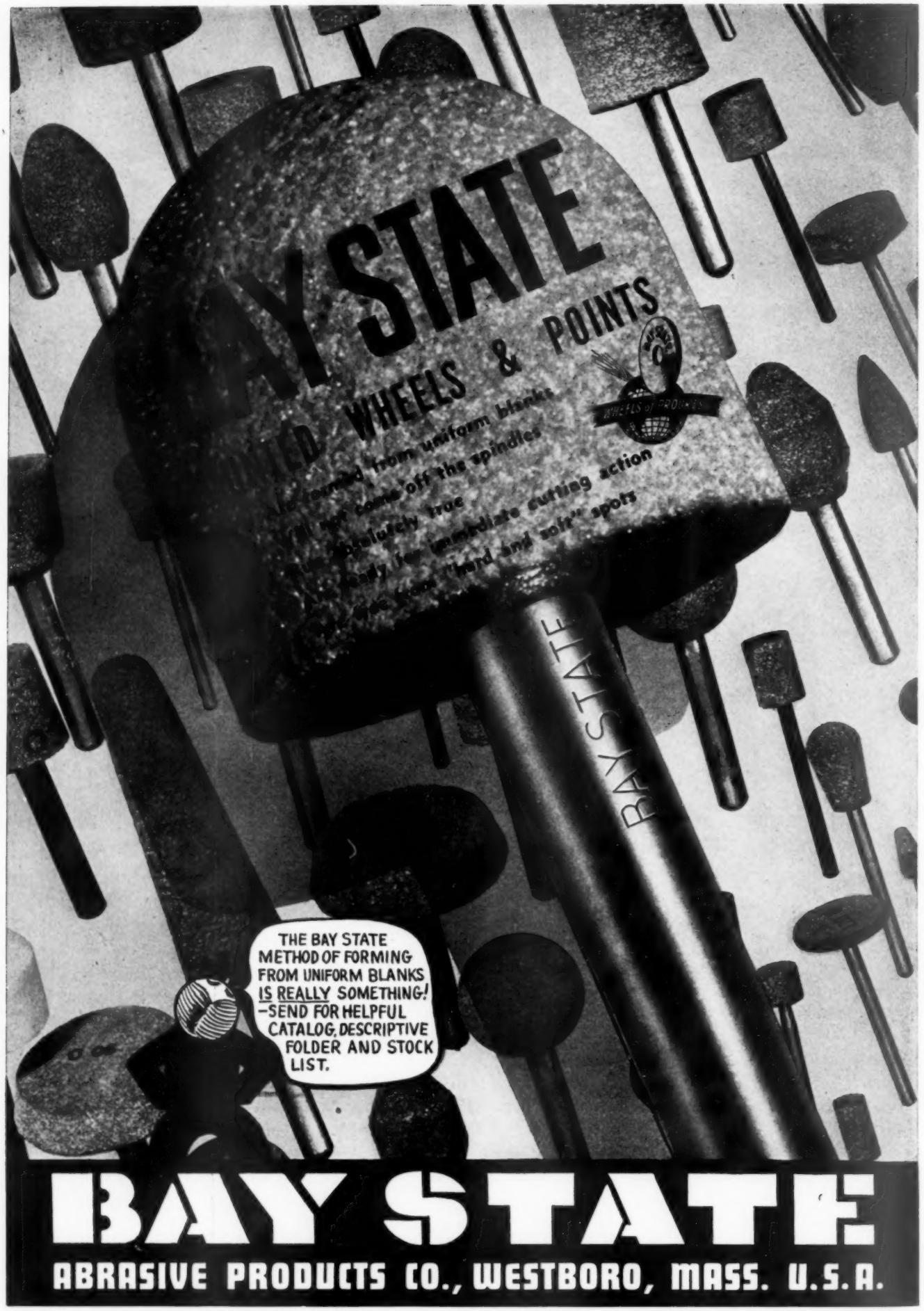
The Speedmullor is the only machine that mulls between two pieces of live rubber—a rubber-lined wall and a rubber tire—surfaces that do not crush and grind—surfaces that outlast steel many times.

B & P Speedmullors, in combination with B & P Sandslingers, assure you greater output of higher quality castings at lower cost. B & P engineers are ready to study your problem, and make recommendations without obligation to you.

B&P "BETTER METHODS"

THE BEARDSLEY & PIPER COMPANY

2541 North Keeler Avenue Chicago 39, Illinois


AY STATE
ED WHEELS & POINTS
RAYSTATE
THE BAY STATE METHOD OF FORMING FROM UNIFORM BLANKS IS REALLY SOMETHING! -SEND FOR HELPFUL CATALOG, DESCRIPTIVE FOLDER AND STOCK LIST.
BAY STATE
ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

LION BINDER

Lion Binder is essential in the Core Room of today. It is an excellent core paste; as a binder it gives high dry strength; it imparts toughness to molding sand; and is desirable in controlling hot strength.

Lion Binder is an ideal partner of core oil. Use both together in the core sand and see the advantages.

Lion Binder is an ideal partner of Ground Pitch. In the same core Lion Binder and Ground Pitch bake fast and clean easy.

Lion Binder will not cause blows, scabs or buckles.

A booklet telling how to use Lion Binder is yours for the asking.

Manufactured only by

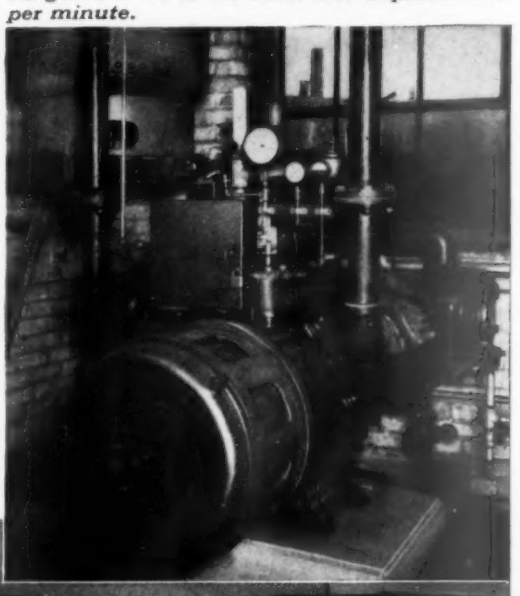
J. S. McCORMICK COMPANY
25TH STREET AND A. V. R. R.
PITTSBURGH 14, PA.

LION BINDER FOR MAKING AND PASTING CORES

helping keep PRODUCTION at a white-hot peak . . .

AMERICAN foundries are making production miracles a commonplace event these days. And Gardner-Denver "RX" and "WB" compressors are helping the tremendous production effort by their unfaltering, continuous performance under the toughest of service demands. Built for heavy-duty service, Gardner-Denver "WB" and "RX" compressors are featured by such outstanding advantages as unrestricted air passages and large valve areas—extra strength and durability—smooth, trouble-free operation and low maintenance cost. Write Gardner-Denver Company, Quincy, Illinois, for illustrated, descriptive booklet.

For high efficiency air output where space is at a premium, Gardner-Denver "WB" two-stage air compressors provide big capacity in a machine of unusual compactness. Comparable in efficiency to compressors of much larger size, the "WB" compressors are built in capacity range from 142 to 445 cubic feet displacement per minute.

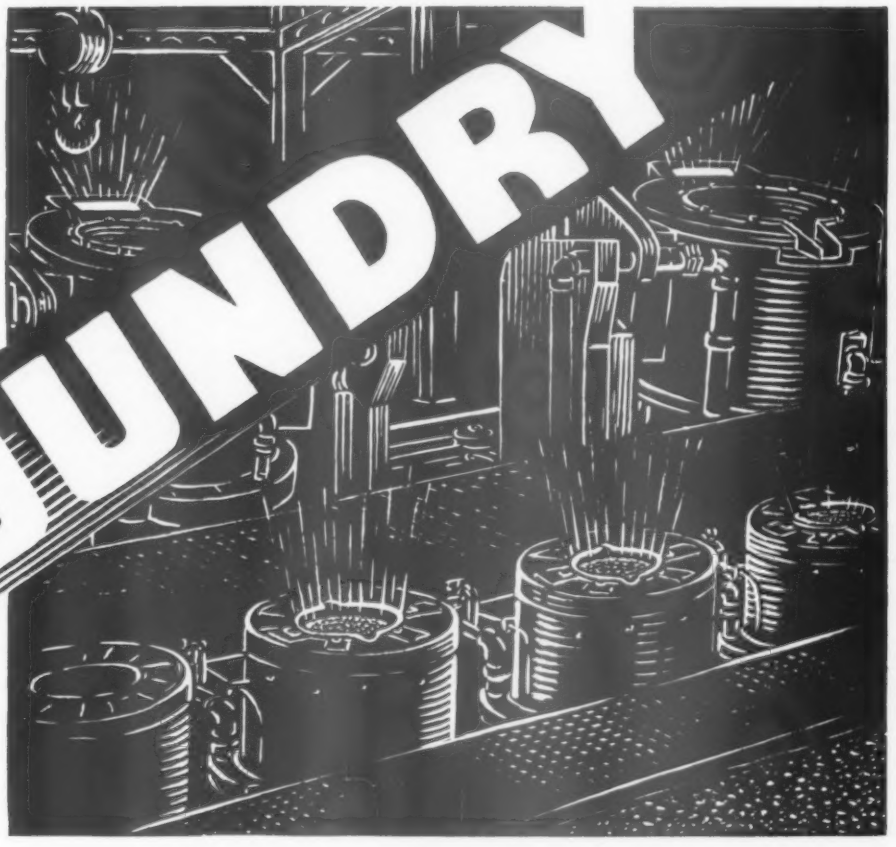


Where large capacities of compressed air at extremely low cost are desired, the "RX" single-stage horizontal air compressors are the answer. Their horsepower requirements are unusually low and they automatically regulate air output to fit air needs. "RX" compressors are available in capacities from 89 to 1292 cubic feet displacement per minute.

GARDNER-DENVER

Since 1859

The MODERN . . . FOUNDRY



. . . can be gauged by many standards—yet, perhaps best defined as the combination of scientifically established facts involving equipment, plant layout, production requirements, and type of products as dictated by the individual problem.

A foundry may be the last word in modern equipment, ideally located and equipped with the latest facilities,—yet, far from "modern" in the terms of quality and quantity production if the equipment is not scientifically coordinated to plant and production conditions.

Present your Non-Ferrous Melting and layout problems to Fisher today. Bulletins are available on stationary, hand tilting, and motorized tilting furnaces, and blowers. Motorized furnaces are offered either as electric or hydraulic tilting.

Fisher has pioneered many revolutionary features in Non-Ferrous Metal Melting Equipment that are daily providing labor, time and material saving advantages found in no other equipment—and Fisher has applied the scientific coordination of these plus-value features to the individual requirement. This experience can save you many man hours and provide maximum efficiency with materially reduced operating costs.

5519 N. WOLCOTT AVE., CHICAGO 40, ILLINOIS

Fisher FURNACE COMPANY

Engineers and Manufacturers of Metal Melting Equipment

KORGLAZE

FOR PROCESSING CORES TO A FINE, SMOOTH FINISH

KORGLAZE provides a practical method of reducing machining costs, thereby saving time, metal and labor—so vital at this time. By the use of KORGLAZE a smooth inner surface is assured and metal can be cast to more exact dimensions. Machining becomes merely a finishing operation. Also KORGLAZE saves cleaning costs. The cored surface of castings shows a smooth, even finish and burnt out cores come away from the metal freely. If castings are of the type to carry fluids, they are automatically washed cleaner when the center is smooth and no roughness exists to slow up rate of flow or to gather solids which may be in suspension.

KORGLAZE is mixed with graphite, the two products simply stirred together cold at the time cores are treated. Cores may be dipped or sprayed and can be treated while either hot or cold. Let us tell you the complete story of this simple, low cost method of improving your castings.

Results obtained through the use of KORGLAZE are astonishing. A demonstration in your foundry will convince you that you can't afford to be without KORGLAZE . . . . WRITE!

UNITED OIL MFG. CO.

1429 Walnut St., Erie, Penna.

Fresh food on the high seas during long, heavy-action periods away from port is the result of compact, efficient refrigeration.
Self-Contained ¼ h.p. Refrigerating Unit
Cool, clean air protects the life of the wounded in Army hospitals. Special aircraft refrigerators safeguard serums and plasma.
Aluminum Aircraft Refrigerator
Peak welding efficiency is made possible by cooling of welding tips with water or brine held at the right temperature.
Spot Welder Tip Cooling Unit
Tool life is increased and rejections are fewer when cutting oils used in high-speed machining are properly cooled.
Refrigerating Unit
The health of our armed forces is protected by dependable refrigeration in cantonments, huts, barracks, and on ships.
14 Cylinder Refrigerating Compressor
Super accuracy in gauge rooms is possible when the air is clean, dehumidified, and maintained at a constant temperature.
3 h.p. "Packaged" Air Conditioner
Protection in the tropics against the ravages of humid atmosphere and vermin is necessary to preserve food and equipment.
Portable Panel Refrigeration Unit
Identical performance of aircraft engines is assured by operation tests with carburetor air kept at the same temperature.
14 Cylinder Air Conditioning Compressor
Clean, dry atmosphere is vital for machining sensitive metal surfaces where a spot of rust would ruin high-precision products.
5 h.p. "Packaged" Air Conditioner

★ CHRYSLER AIRTEMP AT WAR ★

From tiny, fractional horsepower to big 75 horsepower units, Chrysler Airtemp Radial Compressors are performing a major war job on both the production and battle fronts.

The science of air control is built around the compressor. Chrysler Airtemp's *exclusive* Variable Capacity Radial Compressor provides a new efficiency and accuracy in indoor climate regulation. The radial cylinders cut in or out automatically, one at a time, to meet varying load requirements. This flexibility eliminates the peaks and valleys resulting from abrupt starting and stopping of ordinary compressors . . . holds temperature and humidity at a constant level.

Years spent in building delicate mechanisms, have developed high-precision, versatile skills at Airtemp, now devoted to war production. Backed by Chrysler Corporation research and engineering, when peace comes, these skills will again create heating, cooling and refrigeration units for homes and commercial use that will set new, high standards of efficiency and performance.

The lessons learned during peace in free competitive enterprise—freedom of the individual to produce and compete—today bring strength to a nation at war.

War Products of Chrysler Corporation

Tanks • Tank Engines • Navy Anti-Aircraft Guns • Army Anti-Aircraft Guns • Bomber Fuselage Sections • Bomber Wings • Bomb Racks • Bomb Shackles • Fighter Landing Gears • Aluminum Alloy Forgings • Aluminum Alloy Castings • High-Powered Aircraft Engines • Cycleweld Cement • Wide Variety of Ammunition • Anti-Tank Vehicles • Command Reconnaissance Cars • Troop and Cargo Motor Transports • Ambulances • Weapons Carriers • Gyro-Compasses • Navy Pontoons • Marine Tractors • Harbor Tugs • Marine and Industrial Engines • Smoke Screen Generators • Air Raid Sirens and Fire Fighting Equipment • Powdered Metal Parts • Cantonment Furnaces • Tent Heaters • Refrigeration Compressors • Field Kitchens • and Other Important War Equipment

Tune in Major Bowes every Thursday, C B S, 9 P. M., E. W. T.

Chrysler Corporation

PLYMOUTH • DODGE • DE SOTO • CHRYSLER • AIRTEMP • AMPLEX

BACK THE ATTACK—BUY WAR BONDS

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

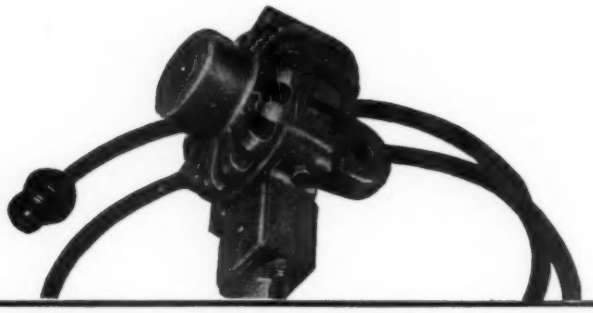
Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ⅓ h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.



ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

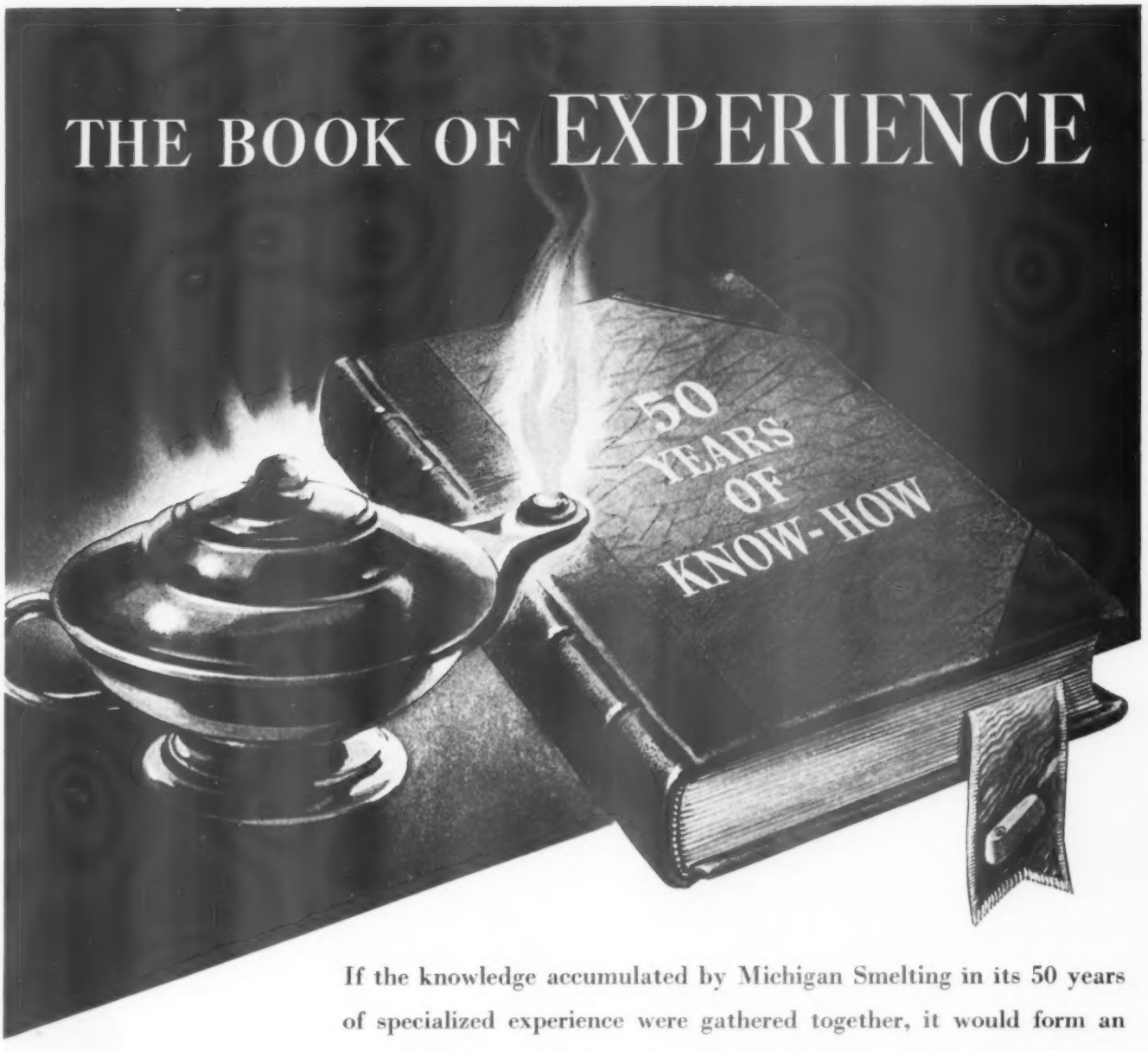
No. 1—Light match plate work	$10.00	No. 5—Heavy match plate, tub, bench	$17.00
No. 2—Medium match plate	13.00	No. 9—Machine and heavier	24.00

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street — Chicago, Illinois

CABLE ADDRESS: "ROTOPLANE CHICAGO"

THE BOOK OF EXPERIENCE



If the knowledge accumulated by Michigan Smelting in its 50 years of specialized experience were gathered together, it would form an authoritative and basic reference book covering this entire industry. Non-ferrous scrap metal refining has been our business for half a century. The sound technical knowledge and wide practical experience possessed by our executive staff is at your disposal. When you are in the market for non-ferrous alloys, consult us for your requirements, no matter how rigid, exacting or unusual.

BUY
WAR
BONDS

NON-FERROUS SCRAP METAL REFINERS FOR 50 YEARS

MICHIGAN SMELTING and Refining

Division of

BOHN ALUMINUM & BRASS CORPORATION · Detroit, Michigan

General Offices: Lafayette Building

May It Be
a Plowshare
Soon!

This is the third Christmas season the foundries of America have been pouring out the weapons of war —weapons necessary to bring a true Christmas to the earth again. Osborn is proud of its part in developing and building so many of the machines that are helping the country's foundries do their magnificent production job.

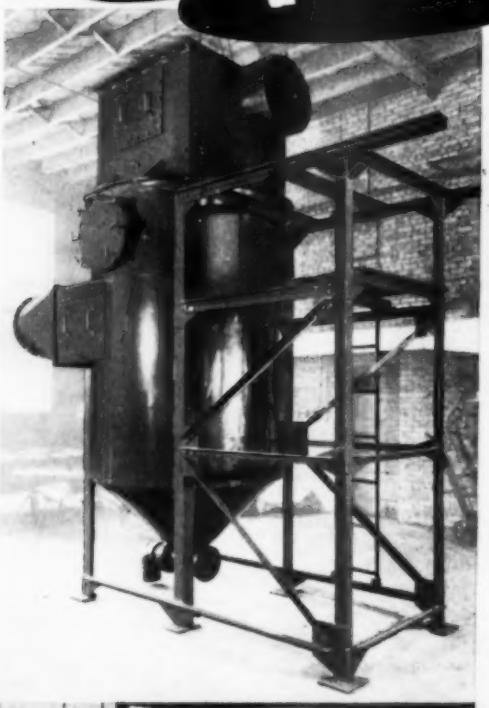
Some day you will go back to moulding the parts of peace—and there, too, Osborn machines will continue to serve you. While Osborn production has been increased many times to meet the emergency of war, every Osborn machine is built with the same precision—*to develop precision and production* —for which Osborn has been known for 50 years.

THE OSBORN MANUFACTURING COMPANY

5401 HAMILTON AVENUE CLEVELAND, OHIO

MOULDING MACHINES

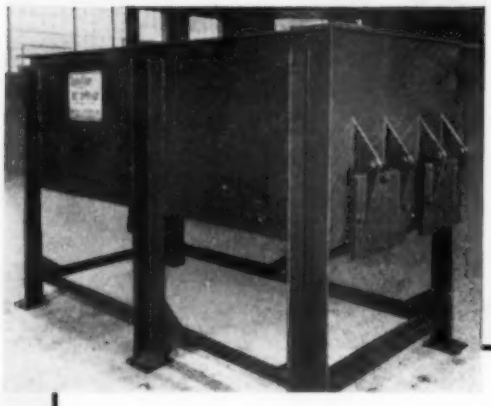
Is Your Foundry a "DUST BOWL"?



In the present day competition for labor, working conditions in foundries must be given increasing attention. Workmen cannot be attracted to a "dust bowl" if more attractive jobs are available elsewhere.

Whiting Hydro-Clones are unsurpassed for suppressing the dust from shake-outs and sand reconditioning systems . . . because the dust is suppressed—not just collected. Hydro-Clones use no spray nozzles, cloth bags, or screens—have no moving parts.

Whiting Hydro-Clones are like a "morning shower" to foundry production, eliminating the dust cloud and leaving clean, fume-free air. Individually engineered to your specific needs. For details, write Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.



TYPE "SH" HYDRO-CLONE (above) and SLUDGE DEWATERING TANK (below) Hydro-Clone completely suppresses dust, discharging it as sludge. Cannot freeze ...self-cleaning. Sludge ejector available(extra) if desired.

HYDRO-CLONE GRINDING, BURRING, and POLISHING BENCH (right) Protects 1 to 4 workers from hazardous dust and fumes. Safe for finishing magnesium castings. Operator works in full freedom.

"WETTING IS TRUE SUPPRESSION"

WHITING
CORPORATION
HYDRO-CLONE DUST SUPPRESSION EQUIPMENT

Power Operated Electrode Clamps

. . . AND ACCURATE HYDRAULIC ELECTRODE POSITIONING . . .

. . . these are only two of the many reasons why Hydro-Arc electric arc melting furnaces have "caught on" in the industry. Other important advantages of Hydro-Arc furnaces are: 1. Especially low operating cost. 2. Low carbon pick-up. 3. Low electrode and power usage. 4. No climbing on the furnace in the intense heat to strain on burnt bolts and no swinging the sledge hammer to clamp electrodes. 5. Electrodes slipped from floor. 6. No steel cable stretch, none to break. 7. Fast electrodes. 8. Simple control . . . can change any part in a few minutes. 9. Cleans dust off electrodes as they are slipped. 10. No troublesome limit switches on the electrode arms. 11. Large roof ring diameter . . . saves burning out flanges.

Write for more information about what has been called "the most important development in electric melting furnaces in the past twenty years."

HYDRO-ARC
FURNACE CORPORATION

561 HILLGROVE AVENUE, LA GRANGE, ILLINOIS (A Suburb of Chicago, Illinois, U. S. A.)
TELEPHONES: LA GRANGE 4545 and 4546 CHICAGO LINE: ENTERPRISE 1068

Associated with Whiting Corporation

Major
PRODUCTION
Operations
DEMAND THE BEST
And "the best" in Chaplets, Chills and Superchills (patented) has long been identified with the fine old name of Fanner.
Today, more than ever, when there can be no compromise with either time or quality in turning out the best possible castings in the shortest possible time, the need for these vital Fanner products is a very essential "must" in every successful production speed-up.
Our engineering experience is "at your service" in helping you take full advantage of speeding up your casting program with Fanner Chills, Chaplets and patented Superchills. Call on us.
PRODUCE for VICTORY but PLAN for PEACE

THE FANNER MANUFACTURING CO.

Brookside Park, Cleveland, Ohio • The Canadian Fanner, Ltd., Hamilton, Ontario

TREBLE THE PRODUCTION OF EVERY MAN?

★ Now, more than ever, it is essential that every man be equipped to produce a maximum amount of work for War equipment.

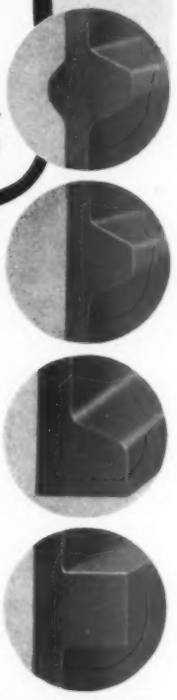
Herman machines in your molding department will enable you to treble, yes, often quadruple or quintuple the work of your molders with proper departmental layout. It makes no difference if your work is large or small, intricate or simple, Herman equipment will make it better, and faster.

These statements are, of course, but generalities. For real proof, we cordially invite you to call for one of our experienced foundry engineers who will gladly study your problems with you and make recommendations for improvements in your molding department. No obligation.

MOLDING **HERMAN** MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

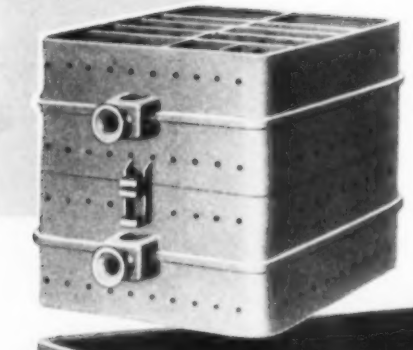
I'll tell the World *Sterlings* are LIFETIME FLASKS

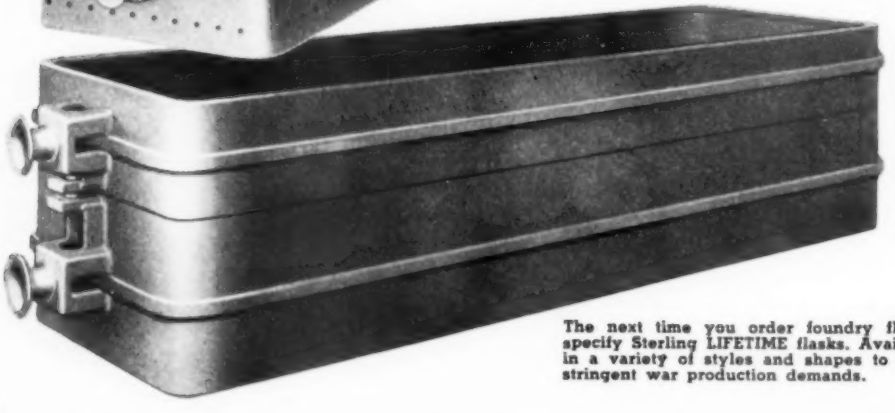


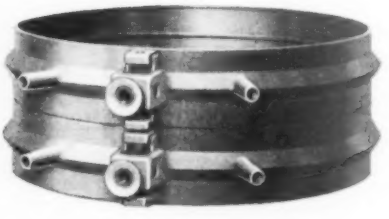
"Sterling Flasks are certainly 'tough babies'! I know, for we've used them ever since we started in the foundry business. It's unbelievable, but I can show you some Sterlings that have seen hard service, almost continuously, for 25 years. And if you were to inspect them today, you'd find them as good as new. That's because Sterlings are solidly constructed of all-welded, rolled steel, with reinforcing ribs and square flanges, full-width bearing and other substantial features. Yes, sir! On the long run, it always pays to buy the BEST!"

(Patent No. 1974292)

Typical features include integral ribs and flanges . . . all-welded construction . . . solid center reinforcing rib . . . square flanges . . . full-width bearing.







The next time you order foundry flasks, specify Sterling LIFETIME flasks. Available in a variety of styles and shapes to meet stringent war production demands.

Sterling FOUNDRY FLASKS

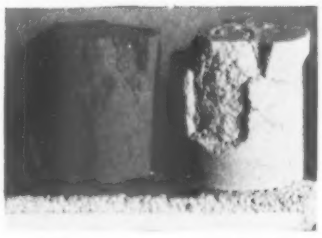
STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

VOLCLAY BENTONITE

NEWS LETTER No. 7

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

CUTS and WASHES



No. 1 No. 2

These facings will cut and wash!

No. 3

This will not!

What is the difference?

The above mixtures No. 1 and No. 2 have no hot or retained strength. The specimens seem hard when dried, but they cannot stand high temperatures.

No. 3 specimen has high fired strength.

Down sprues, gates, runner cups and large mold surfaces must have fired strength.

Therefore, it is essential that a bond be used that does not cut and insures proper dry and fired strengths, as well as green.

Volclay bentonite is recommended.

No. 3 specimen is bonded with only 5% Volclay, nothing else.

SUMMARY OF THE CAUSES OF WASHES AND CUTS

A wash or cut is defined as rough lumps of metal and sand grains on the casting. Round corners that should be sharp. Depressions or erosions with rough surfaces will be found along the flow of metal.

GATING--Improper gating, either too large or too small. Not properly located.

MOLDING--Soft ramming.

MOLDING SAND--Incorrect moisture, either too high or too low. Dry and hot compression strengths too low. Not enough seacoal (if gray iron or malleable). Low green compression strengths, not enough bond.

CORES--Overbaked or poorly bonded. To overcome use mineral (bentonite) bonds, decrease cereals, oils and other low temperature binders.

★ ★ ★

Write for our "Heat Penetration into Foundry Molds" Bulletin 223-C. Shows causes of washing and cutting, and how to eliminate them by proper bonding.

VOLCLAY BENTONITE HAS SERVED FOUNDRIES FOR 15 YEARS!

AMERICAN COLLOID COMPANY

363 WEST SUPERIOR STREET • CHICAGO 10, ILLINOIS

Producers of Volclay and Panther Creek Bentonite

GLOVES, HANDPADS AND MITTENS

made by AO for Foundrymen

Shown above are four important items needed by many of your workmen—to protect their hands and forearms. AO offers a complete line of protective gloves, mittens, and handpads, in all standard styles and lengths.

No. 1644 Reinforced Steel-Stapled Gloves

These reinforced, gauntlet-style gloves are especially recommended for workers who handle castings, sheet steel, and plates. The entire working area of these gloves is reinforced with heavy strips of tough leather, studded with steel stitches. The thumb has a special reinforcing patch.

No. 1514 Reinforced Asbestos Gloves

These gauntlet-style, asbestos gloves are recommended for operators who work in heat treating departments, and for those who have to handle hot materials. The palm and working side of the thumb are reinforced with chrome tanned leather —to provide added protection and extra wear. The gloves are double-stitched for double strength.

No. 1202 Reinforced Handpads

Made of chrome tanned leather, reinforced with a steel-studded patch covering the entire working area, these pads are recommended for operators on jobs where protection to the back of the hand is not a problem. They can be worn on jobs where gloves or mittens would seem too hot or cumbersome.

No. 1678 Reversible Mittens

Made of chrome tanned leather, these mittens are recommended for handling rough or jagged materials. They are reversible for extra life. All seams are steel stitched.

Your AO Safety Representative will gladly show you these items as well as leggings, spats and other safety equipment needed for an efficient and economical head-to-ankle protection program.

American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS

Manufacturers for 110 years of products to aid and protect vision. Branches in all principal industrial centers

The CLEARFIELD

900 SERIES

SHORT MIXING CYCLE

IMPROVED MOLDS

MINIMUM REJECTS

Ideal

FOR EITHER BATCH OR CONTINUOUS HANDLING SYSTEMS

If you need top capacity, investigate these big Clearfields whose high production and operating economies are being demonstrated daily by major steel, iron, and magnesium castings producers, such as Ford Motor Company, U. S. Steel Corporation, Jones & Laughlin, Inland Steel, American Steel Foundries, Michigan Light Alloys, Burd Piston Ring, General Motors, Bendix Aviation, Ingersoll-Rand, U. S. Radiator, National Radiator, Crouse-Hinds, Atlas Steel Castings, Symington-Gould, Atlantic Foundry, Humphryes Manufacturing, National Malleable, Pittsburgh Steel Foundries, United Engineering & Foundry, Marshall Stove, and a host of others.

Let our engineers show you what the CLEARFIELD will do on YOUR work!

CLEARFIELD MACHINE COMPANY

CLEARFIELD
PENNSYLVANIA, U. S. A.

Your inquiry is invited. If you desire a definite proposal, please state quantity and type of sand to be conditioned and characteristics of available electric current.

EFFICIENCY AND LONG LIFE PLUS LIGHT WEIGHT .... IN FREMONT

FLASKS AND JACKETS

ENDORSED
BY STEEL FOUNDRIES
EVERYWHERE

FREMONT FLASKS and JACKETS have established a reputation for efficiency and long wear and in most progressive foundries have replaced old type, cumbersome, heavy weight equipment.

FREMONT JACKETS have special ribs to permit escape of gas from the mold. Standard jackets are furnished with or without ribs. "Ribbed jackets" should be specified when ordered.

The FREMONT FLASK with the 1" GROOVLOCK PIN is especially adapted to snap work but can also be furnished with cast ears to accommodate standard pins.

Slip Flasks **FREMONT** Jackets

GROOVLOCK

THE FREMONT FLASK CO...FREMONT, OHIO

TABOR JAR-RAM, HAND ROLLOVER, HAND-DRAW MACHINES...

This type of machine is in a class by itself for high production ability. The jarring member rams molds in the shortest possible time and the rollover member will handle flasks or core boxes, unrestricted in length, up to the full width and weight capacity of the machine.

Made in several sizes and capacities. Can be furnished with squeeze member added when desired. Write for Bulletin 424 illustrating and describing the complete line.

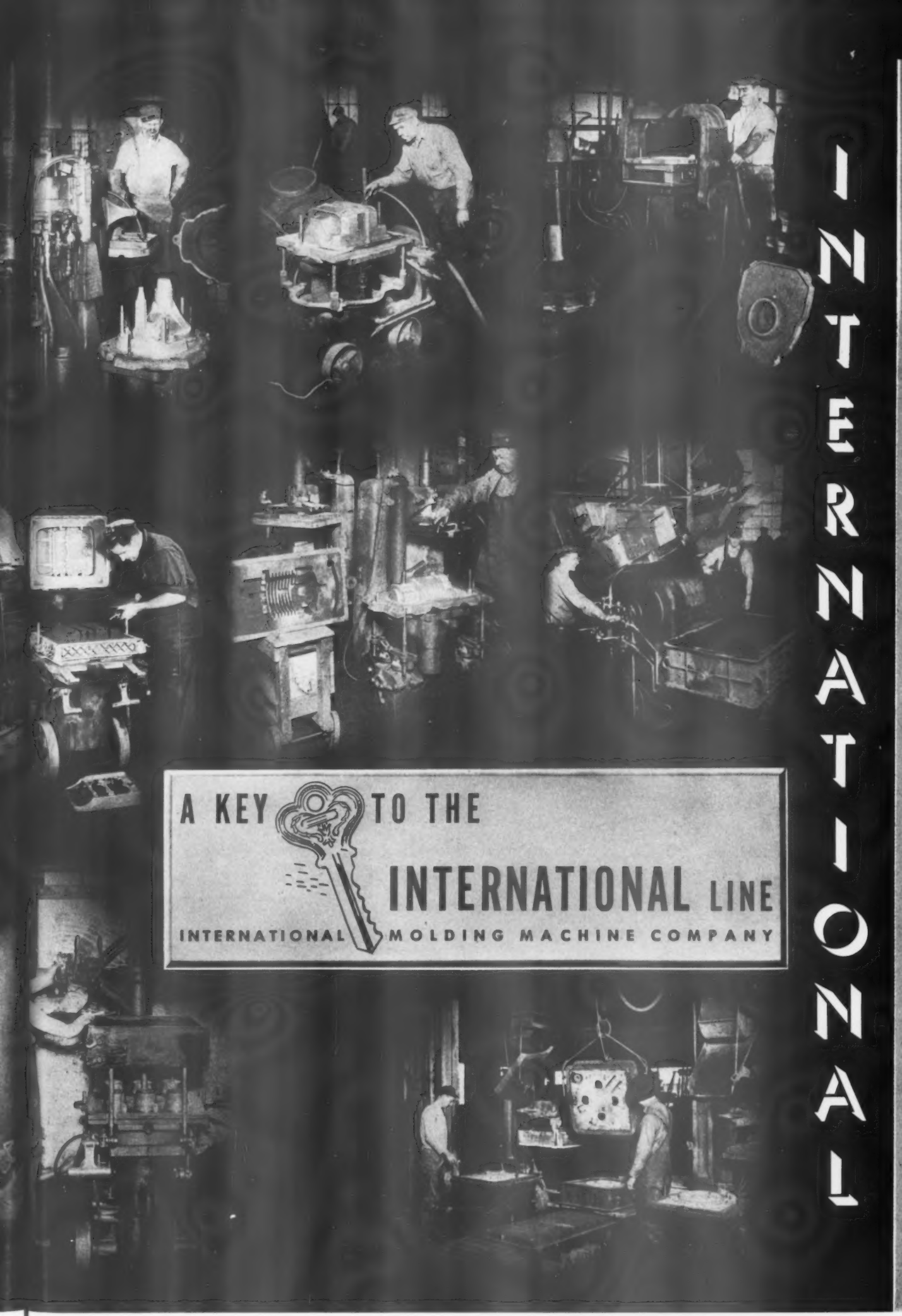
TABOR PNEUMATIC VIBRATORS

Built to stand punishment. Durable and effective in action, they are the result of over a half-century's experience and will return unfailing, continuous service.

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.;* Carl F. Miller & Co., *Seattle, Wash.*

THE TABOR MANUFACTURING CO.
6225 Tacony Street
Philadelphia 35, Pennsylvania

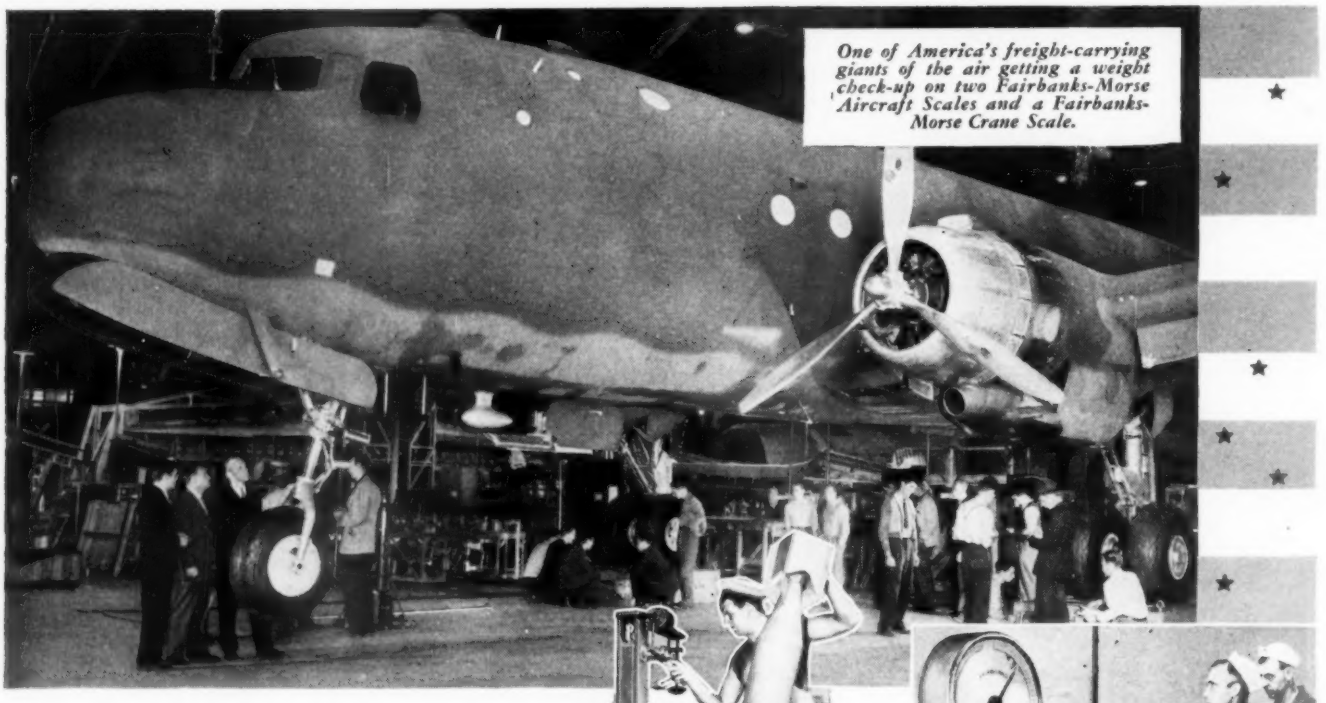
On these pages we show the *COVER* of our **"KEY"** catalog, which contains pictures of all standard types of INTERNATIONAL machines, and many Special designs. Write for *YOUR* copy.



INTERNATIONAL MOLDING MACHINE COMPANY

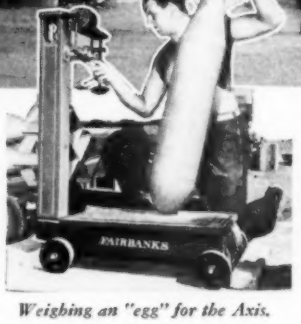
2608-2624 WEST 16TH STREET • CHICAGO, ILLINOIS

Fairbanks-Morse Scales in Warwork

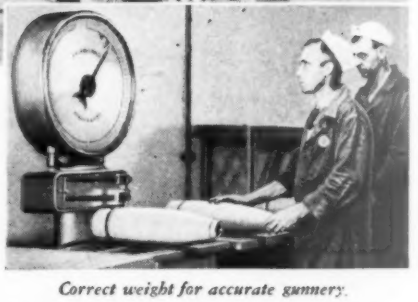


One of America's freight-carrying giants of the air getting a weight check-up on two Fairbanks-Morse Aircraft Scales and a Fairbanks-Morse Crane Scale.

• WARWORK means *weigh-work* for Fairbanks-Morse Scales. They're weighing munitions . . . food . . . chemicals . . . tanks . . . aircraft . . . shells . . . just about everything, in fact. They are weighing at speeds which human hands can't match. They're weighing with accuracy that human eyes can't equal. They're working in endless shifts that human stamina can't endure. They're helping to speed up America's war effort on the production front, for Fairbanks-Morse Scales are "at home" on the production front, in peace or in war. Fairbanks, Morse & Co., Fairbanks-Morse Building, Chicago, Illinois.

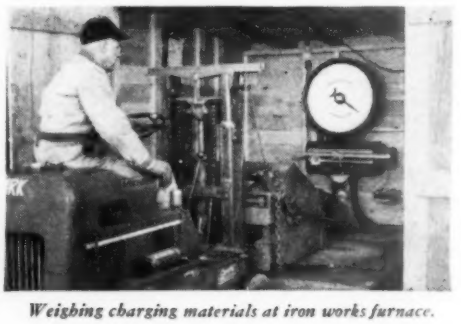


Weighing an "egg" for the Axis.



Correct weight for accurate gunnery.

Frozen eggs—NOT for the Axis!



Weighing charging materials at iron works furnace.

FAIRBANKS-MORSE

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PUMPS
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GENERATORS
WATER SYSTEMS
SCALES
STOKERS
FARM EQUIPMENT
RAILROAD EQUIPMENT

Scales

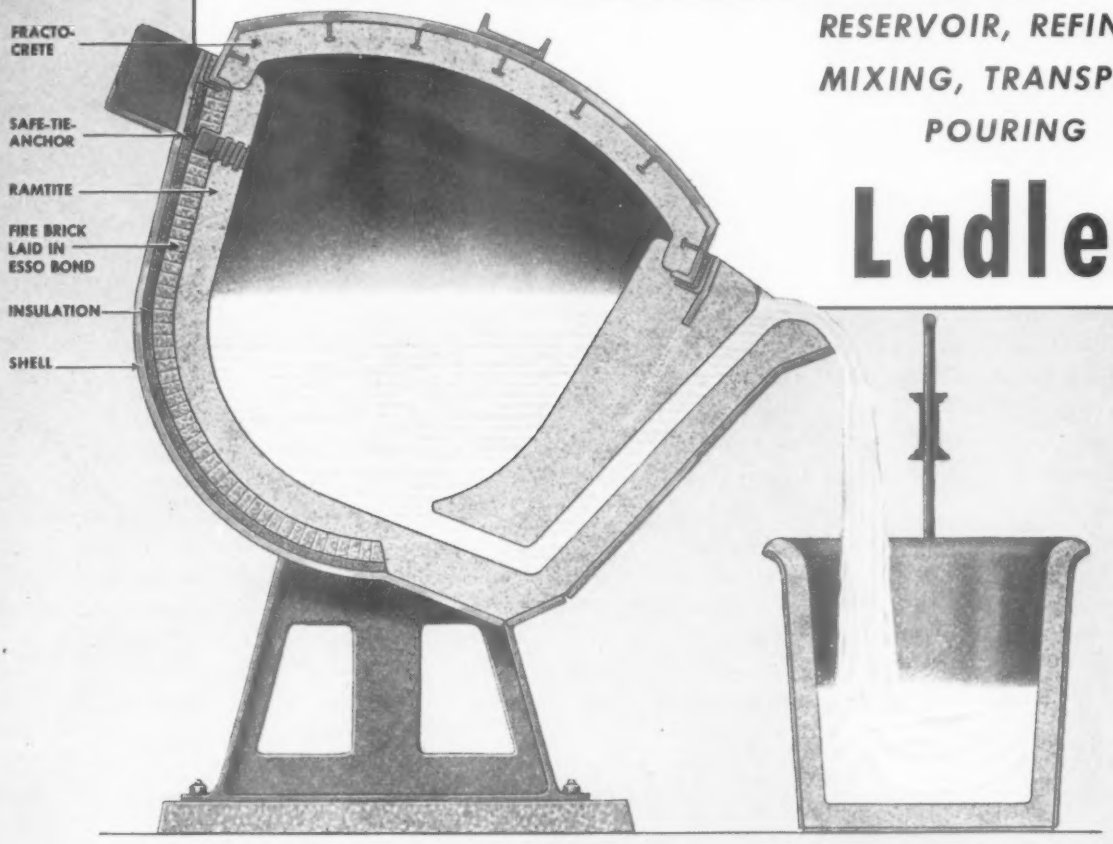
BUY WAR BONDS

RAMTITE PRODUCTS SERVE EVERY INDUSTRY USING HEAT

JUST THE RIGHT REFRACTORY FOR

RESERVOIR, REFINING,
MIXING, TRANSPORT,
POURING

Ladles



RAMTITE PRODUCTS

Ramtite Plastic Refractory ... in three grades

Fracto-Crete and Mono-Cast castable refractories

Esso Bond air set refractory mortar

Hott-Patch heat set refractory mortar

Esso (silicon carbide base) patching and ramming mixes

Safe-tie Refractory Anchors

RAMTITE is ideal for lining ladles because (1) it is installed in plastic form and is easily shaped to the proper contour, (2) its smooth, dense, monolithic surface prevents metal penetration, thus prolonging the life of the lining, (3) the unusual insulating quality keeps the metal at the right temperature for a longer period, (4) it is quickly and easily installed by ordinary plant labor, (5) the safe-tie refractory anchor ties the material to the ladle shell, (6) it has an exceptional combination of engineering properties.

Note the lining construction of the mixing ladle. A permanent fire brick lining separates the Ramtite and insulation, making the entire thickness of Ramtite lining usable. The construction permits repairing or replacing the Ramtite lining without damaging the insulation. This is a typical example of Ramtite products installed in all types of ladles with capacities from 100 pounds to 75 tons.

Send for a bulletin describing the engineering properties of Ramtite.

THE RAMTITE CO..... *Division of The S. Obermayer Co.*
1803 ROCKWELL STREET, CHICAGO 8, ILLINOIS

RAMTITE

PLASTIC REFRACTORY

ANNOUNCING

a change in organization

Our friends in the metallurgical field will be interested in the announcement of a change in the activities of the Adolph I. Buehler organization.

This change is made in order to enable us to maintain a close personal contact with our customers and at the same time provide expanded facilities for handling the rapidly increasing demand for metallurgical testing equipment.

A new organization, Buehler, Ltd., a partnership under my personal direction, will hereafter handle all metallurgical apparatus and sample preparation equipment.

The optical equipment will continue to be handled by the Adolph I. Buehler organization supervised by Mr. George Graves who has long been associated with my staff and who will devote all his efforts to serve you in this field.

The policy of both companies will continue, as in the past, to present equipment of the highest standard of quality in both optical and metallurgical apparatus. Some new and important developments that are anticipated in the field of metallurgical testing apparatus make this change in organization of particular significance to the metallurgist.

Adolph I. Buehler

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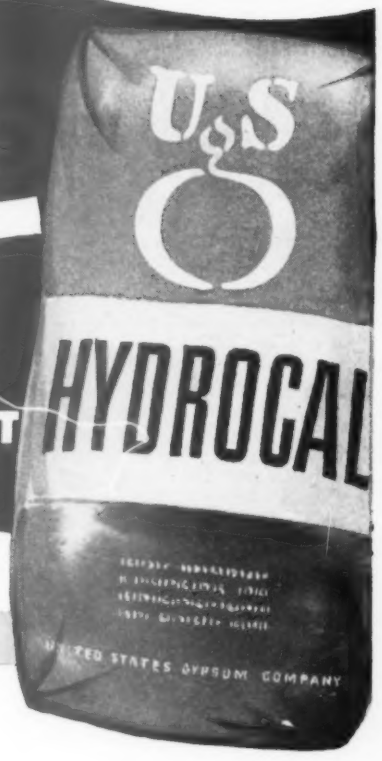
OPTICAL INSTRUMENTS ★ METALLURGICAL APPARATUS

228 North LaSalle Street, Chicago 1, Illinois

HYDROCAL

A SUPERSTRENGTH GYPSUM CEMENT



PATTERNS MADE OF HYDROCAL* CEMENT CAN BE MADE:

QUICKER
HARDER
STRONGER
MORE ACCURATE

HYDROCAL PATTERNS ARE NOT AFFECTED BY:

HUMIDITY
LENGTH OF STORAGE
NORMAL TEMPERATURE CHANGES

HYDROCAL IS MADE BY AN EXCLUSIVE PATENTED PROCESS, IS AVAILABLE IN VARIOUS TYPES TO MEET TRADE REQUIREMENTS. TECHNICAL DATA SHEETS ARE AVAILABLE ON REQUEST.

TECHNICAL SERVICE

U·S·G has a staff of practical, experienced men who will gladly discuss your problems with you and explain how Hydrocal has helped increase production; how it produces accurate castings that require a minimum of finish; how it can broaden the scope of your production. Write for technical data.

*Trademark Reg. U. S. Pat. Off.

Industrial Sales Division

U·S·G UNITED STATES GYPSUM

300 WEST ADAMS STREET, CHICAGO, ILLINOIS

This famous trademark identifies products of United States Gypsum Company—where for 40 years research has developed better, safer industrial materials

TAM ZIRCONITE PRODUCTS AVAILABLE

TAM
Foundry Zirconite Sand (in three grades)
Melting Points from 3650° F to 3950° F

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Foundry Zirconite Flour (in two grades)
Melting Points from 3650° F to 3812° F

TAM
Foundry Zirconite Mold and Core Washes (in three grades)
Super-refractory compounds with melting points from 3600° F to 3775° F

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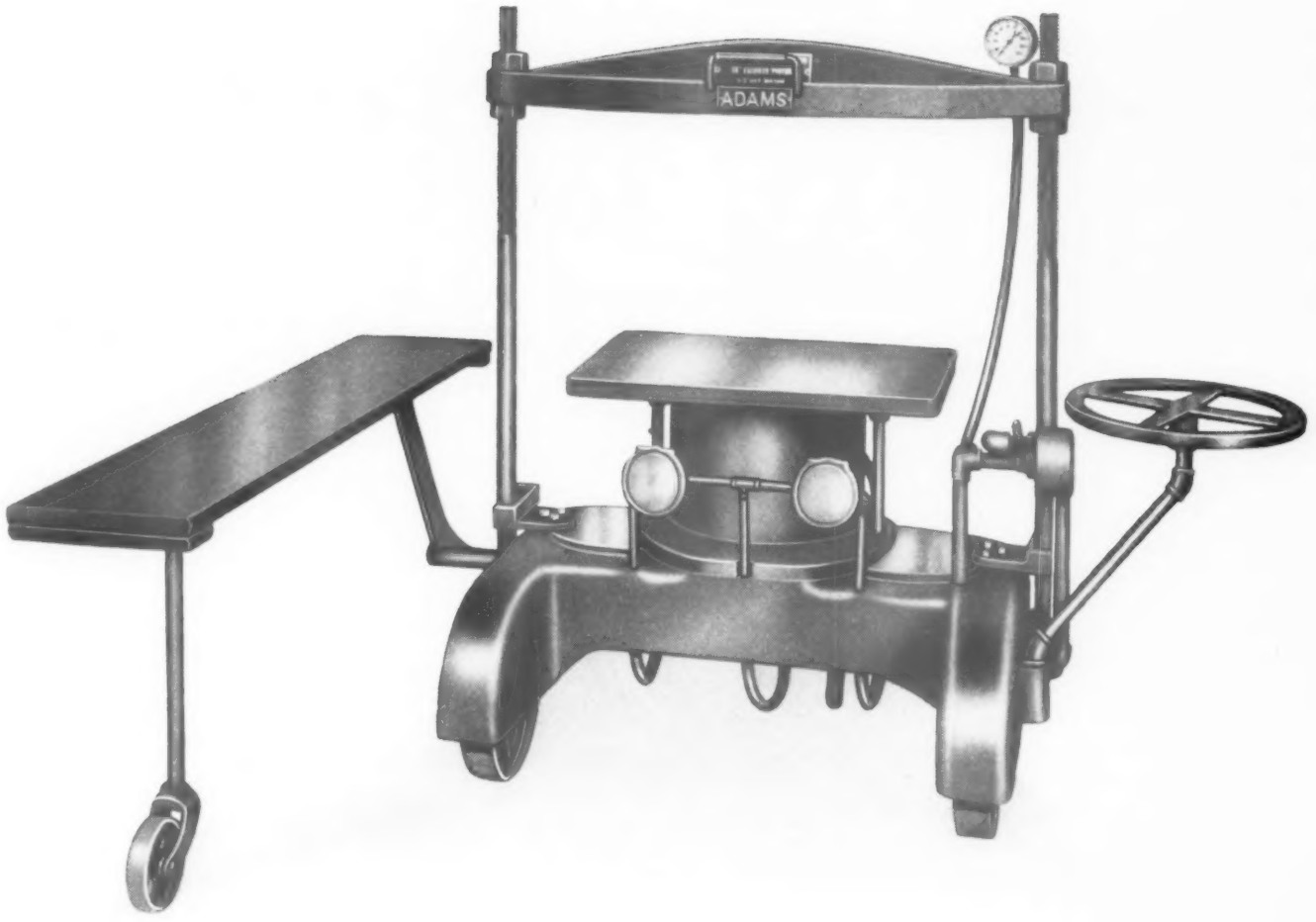


The 12″-38″ Adams Jolt Squeezer, Portable Type

Now, as never before, you need—

Adams Jolt Squeezers

To maintain production in the face of a skilled labor shortage, it is necessary to make full use of modern equipment and processes, in order to transfer skill from man to machine as much as possible.

Adams Jolt Squeezers help to smooth out your skilled labor problem. They are so simple in design and so convenient to handle that no special skill is needed to operate them successfully.

There are sizes and types to fit any requirement of squeezer molding—Side Rod Type and Post Type—Jolt Squeeze and Jolt-Squeeze-Pattern-Draw-Styles — Stationary and Portable.

Catalog No. 705 contains full details. Do you have a copy?

The Adams Company, 700 FOSTER STREET DUBUQUE, IOWA

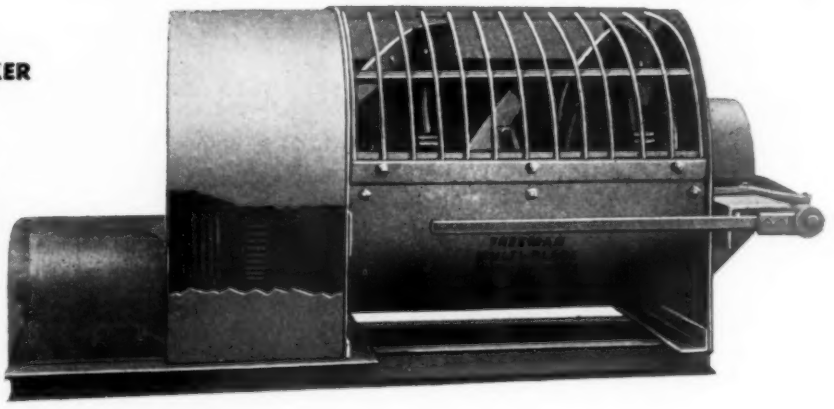
1883 — *Our 60th Year* — 1943

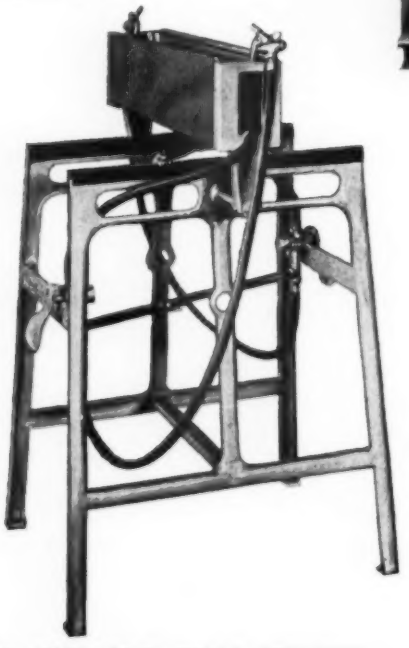
MOLDING MACHINES **ADAMS** **FLASK EQUIPMENT**

3 LEADERS *in* EFFICIENT FOUNDRY EQUIPMENT

FREEMAN *Multi-Blade* FOUNDRY MIXER

Here is a mixer which has everything built-in as standard equipment, and includes many features not even available as accessories on other mixers. Send for a new booklet which explains how differently this mixer is built and just what you may expect of its operation in your plant.





ROSS CORE DRAWER

If you are faced with a manpower problem (and who isn't?), remember that highly skilled labor is not required to draw cores on this machine and the more difficult boxes can be drawn just as fast as the easy ones. Many core boxes require no rigging at all. The Ross Core Drawer makes cores come true to size. Write for descriptive folder.

GAST CORE AND MOLD SPRAYER

This is a low-pressure, large jet atomizing sprayer, equipped with an air motor. It has a gear driven, paddle agitator for applying any type of wash to either green or dry sand molds or cores. It is regularly used with silica, naphtha or gasoline, talc and synthetic washes as well as the graphite or coke based materials. Wash is kept in suspension by paddle agitator when sprayer is used. Send for the whole story!

THE FREEMAN SUPPLY COMPANY

PATTERN SHOP AND FOUNDRY SUPPLIES AND EQUIPMENT

TOLEDO, OHIO

WMC and Other War Agencies Propose Aid To Foundries in Manpower Crisis

REPORTS indicate some improvement in production of malleable castings for the war program. This betterment is due mainly to the determined efforts being put forth by foundry management to meet requirements. Department of Commerce statistics show a total production of 74,874 tons of malleable castings in September, compared with 67,615 tons in August and 61,021 tons in September, 1942. While orders for malleable castings booked during the monthly period fell from 108,505 tons in August to 99,911 tons in September, the spread between bookings and production reveals a continuation of pressure on the malleable industry for more production. Although much of the needed improvement must be realized through relief from present manpower shortages, some assistance will be provided through authorization to expand facilities already given several of the larger malleable producers.

Production of commercial steel castings in September totaled 153,324 tons, according to the Department of Commerce, as compared with 158,832 tons in August and 139,744 tons in September, 1942. Orders for 208,547 tons of steel castings were booked in September, which was 5000 tons above the previous month, and was the highest monthly total of orders since January. These statistics show that the steel foundry industry has done a remarkable job during the past year in increasing production of steel castings for war. Nevertheless, pressure continues for even higher outputs. Problems facing producers of steel castings have been accentuated by cutbacks in production of certain types of war materiel and development of new programs requiring entirely different types of steel castings. Frequently castings for these new programs cannot be produced in some of the newer foundries which have been built during the emergency to make special types of castings. Manpower continues the key to problems of increased production in steel foundries.

While no monthly statistics are available on production of gray iron castings—a situation which should be corrected by government agencies since complete data are in the hands of the War Production Board—reports from the field show that many gray iron foundries are up against a serious manpower situation which is holding back production of castings most essential for the prosecution of war. The same situation prevails among many nonferrous foundries.

Importance of castings in war production and the seriousness of labor shortages at last has been recognized by the War Manpower Commission and plans appear to be under way to alleviate the situation. A 12-point program has been developed by the WMC in co-operation with the War Production Board, Army, Navy, Maritime Commission and Office of Price Administration, in which WPB in co-operation with other agencies is recommending to WMC those foundries producing critical castings that are behind on schedules due to manpower shortages. WPB will guide subcontractors to foundries operating in those areas where labor shortages are not acute.

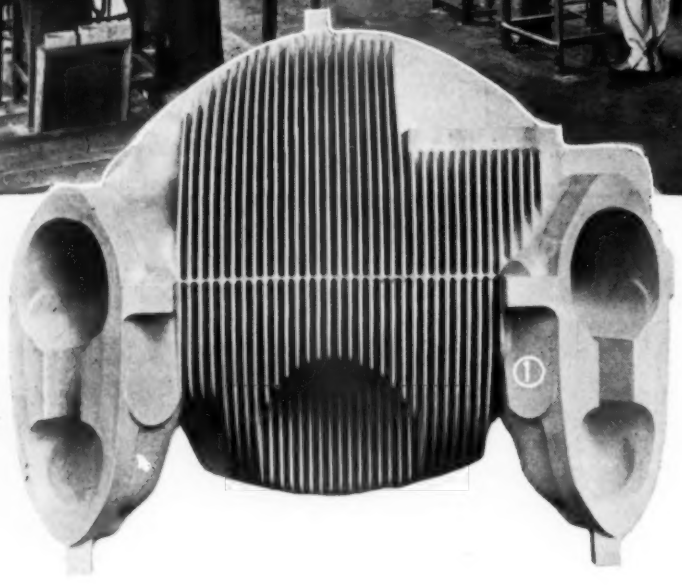
The WMC will complete labor utilization studies and make recommendations for assistance to foundries producing critical castings and having manpower difficulties. The labor utilization staff of WMC will certify individual foundries that produce only items on the critical list and have done everything within reason to solve their own manpower problems through proper labor utilization, training, recruitment, and labor relations. Foundries meeting these requirements are to be certified as "approved foundries."

A procedure developed by Selective Service will give workers in approved foundries special consideration for occupational classification, whether skilled or unskilled. Foundries must have on file a replacement schedule to be eligible for such consideration. Foundries on the approved list are to be entitled to permission to clear workers outside of their areas; special consideration on deferment under Selective Service; and if requested, assistance of WMC, Army, Navy and Maritime Commission in presentation of proper requests for wage and price adjustments to the WLB and OPA. The WPB is to give increased emphasis to improvement of labor relations and worker morale in approved foundries; to help obtain proper plant facilities for approved foundries including lockers, rest rooms, cafeterias, etc., and where necessary assist in financing such improvements; and to seek out in individual plants methods of increasing production through improved industrial processes.

If this plan functions as outlined, a sizeable number of foundries should be given some relief. But with the entire foundry industry limited almost entirely to some type of war production, due to priorities on metals, the plan may result in the shifting of critical areas rather than in relieving the entire situation.

Decision upon the feasibility of increasing production through adoption of improved industrial processes should rest entirely with industry, which has the necessary knowledge and experience in this highly specialized field. WPB should confine its efforts in this connection to helping industry obtain equipment which foundrymen believe is needed.

Frank G. Steinebach
Editor



Women MAKE AIR-COOLED CYLINDER HEADS

By FRANK G. STEINEBACH

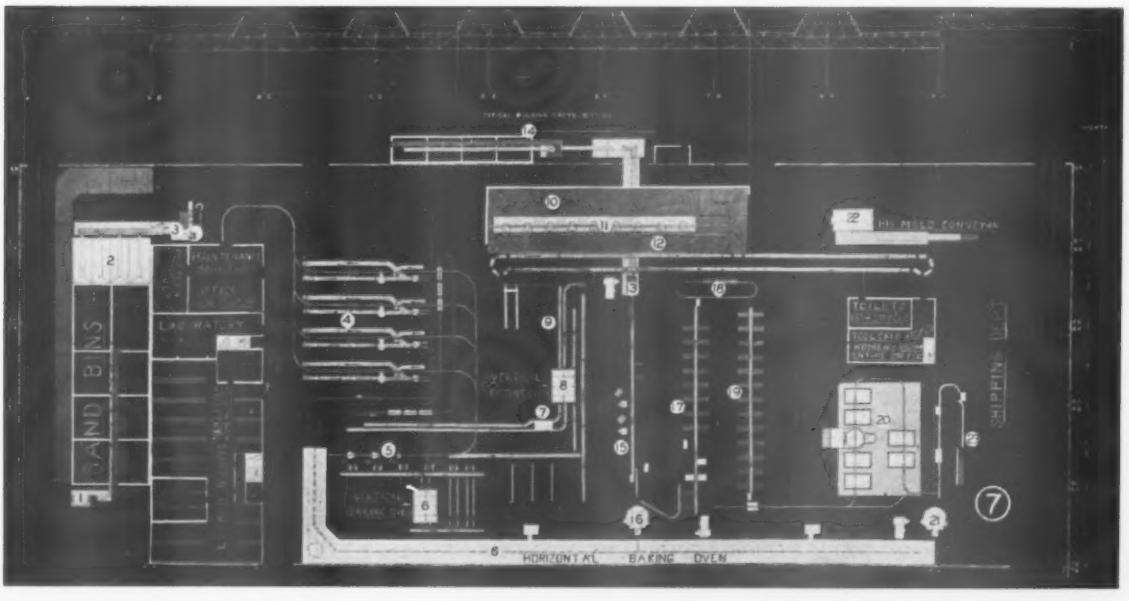
A NEW foundry for the production of cast aluminum heads for air-cooled internal combustion engines recently was placed in operation by the Caterpillar Tractor Co., Peoria, Ill. While this foundry has been designed to utilize modern foundry equipment to the ultimate, and the practice developed for the job deviates in many respects from that which previously has been employed in the production of such castings, perhaps the most interesting feature of the new plant is the fact that women constitute approximately 85 per cent of the foundry personnel, and it is possible this percentage might be increased. As may be seen in the various photographs reproduced in connection with this article, women do practically everything required in producing these intricate castings.

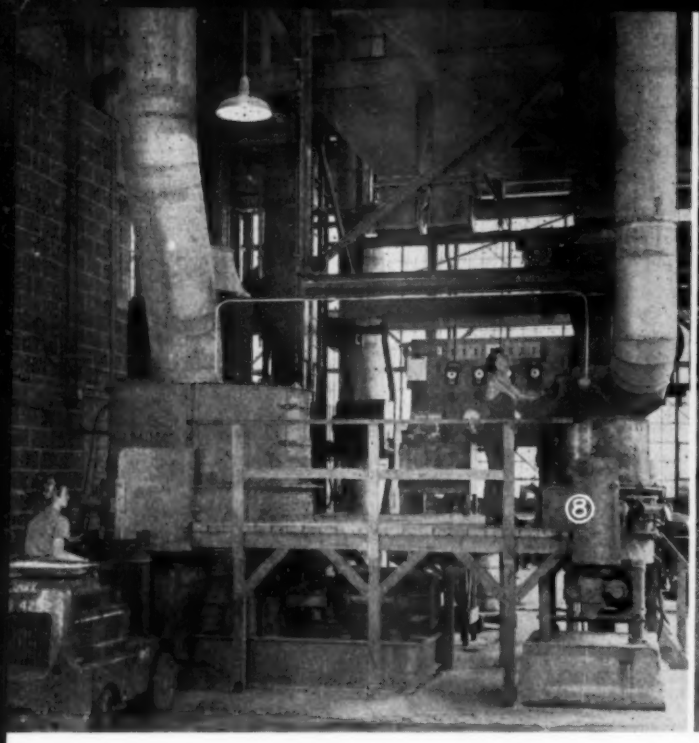
The aluminum foundry is located in a building which already was available when the decision was made to go ahead with the project. But many problems were associated with obtaining necessary priorities and deliveries on the volume of equipment necessary to bring this wartime plant into production, as is well known by many foundrymen throughout the country who have struggled with the same difficulties. Much of the work of expediting priorities and deliveries was simplified by familiarizing those agencies interested in the project with the complete layout of the plant. After plans had been completed, M. J. Gregory, factory manager, Foundry Division, had a special layout prepared which showed the arrangement of all equipment and the flow of materials from the receiving department through the plant. Photostats of this layout, with a key to the various departments, were placed in the hands of everyone concerned with the project. A reproduction of this layout is shown in Fig. 7.

The speed which has been attained in producing cylin-

Fig. 1—Air-cooled cylinder head for large, radial aircraft engine. Fig. 2—Rear view of one molding unit showing the start of operations for continuous making of the body fin cores. Fig. 3—View of unit showing cleaning of pattern, placing of nails, vibrating, jolting and blowing. Fig. 4—Special machine for stripping the core. Fig. 5—Conveyors for handling boxes and dryers. Fig. 6—Core after drawing. Fig. 7—Layout of the foundry with key

1—Sand Unloading
2—Sand Bins
3—Sand Mixing Unit
4—Coremaking
5—Small Coremaking
6—Core Baking
7—Clean and Spray
8—Core Drying
9—Core Assembly
10—Aluminum Storage
11—Melting
12—Pouring
13—Shakeout
14—Refuse Sand
15—Rough Cleaning
16—Sandblast
17—Preliminary Clean
18—Pickling
19—Finish Cleaning
20—Heat Treat
21—Finish Sandblast
22—Remelt Furnace
23—Packing





der head castings at this plant is the result of a number of factors, including the extensive application of equipment in solving the production problem; producing the cores in which the castings are poured on a conveyor system; combining several types of machines to accomplish the operation, including a vibrator table, a jolt machine, a core blowing machine and a special rollover machine; and reducing the number of wires required to reinforce the core to a very small number. These points will be discussed in some detail in a description of the flow of materials through the shop.

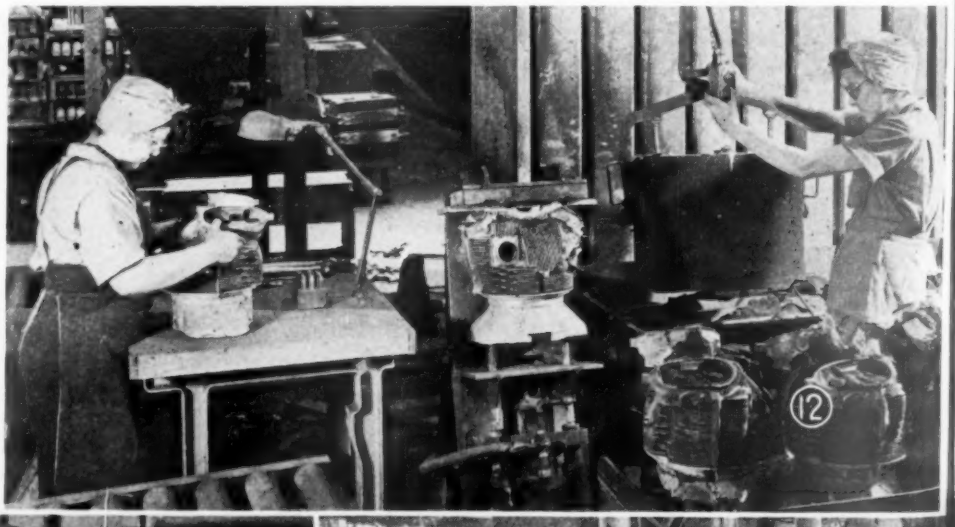
Raw materials are received on a railroad siding located inside the building completely across the south end. Sand bins parallel this side track thus permitting all of the

Fig. 8—Sand is moved from the large bins inside the building to the muller type sand mixers

Fig. 9—As the mold cores move along the conveyor, the surfaces are smoked, cores are set and the two halves are clamped just prior to pouring

Fig. 12—After pouring and cooling, molds are lifted from the mold conveyor, the core is broken, the casting vibrated and the heat number is stamped

Fig. 13—Cutting gates and risers from the aluminum cylinder head casting



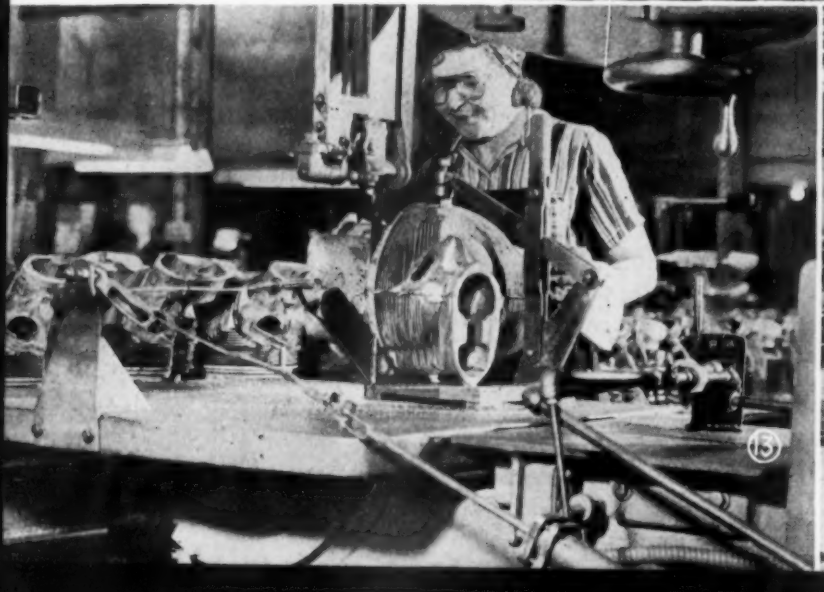


Fig. 10—Mold conveyor showing the loading and pouring stations. With the exception of pouring, all of the operations performed at this station are handled by women

Fig. 11 — Rear of the furnaces showing methods of chlorination, charging and skimming

Fig. 14 — Various stages in the cleaning operation. The machine at the left cleans between the fins of the castings

Fig. 15 — General view of the cleaning department. A water test is being made at the left

sand to be stored inside the building. Sand is taken from the bins and prepared in a muller type mixing unit located near one side of the sand bins, as is shown in Fig. 8. When the plant is complete in all details, the sand will be carried from the mixer to the four coremaking conveyors by monorail conveyors, but that detail had not been completed when the plant was visited.

All sands undergo A.F.A. procedure for grain size class and clay content as well as receiving green compression and permeability tests.

As may be noted in the general floor plan, and in Figs. 2, 3, 4 and 5, the cores in which the cylinder heads are poured are made on four conveyor loops, each one constituting a complete production unit provided with all of the various types of equipment required in producing the cylinder head core. The general layout of the con-

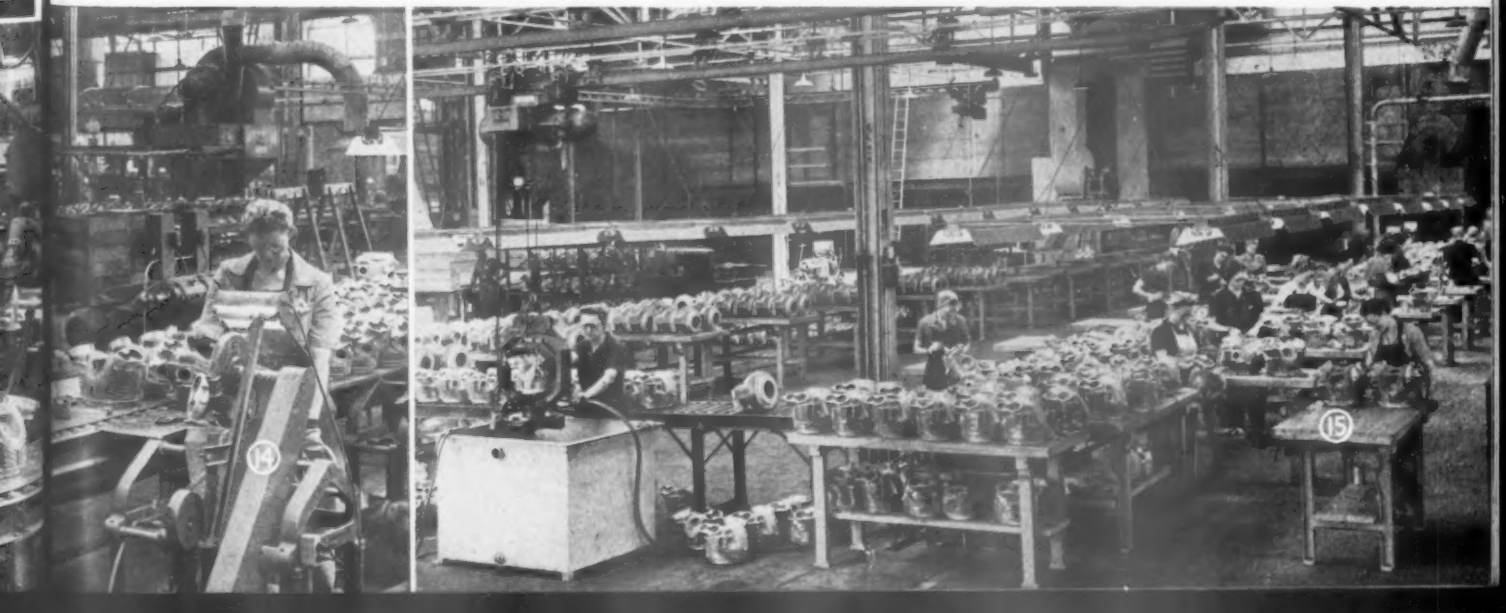


Fig. 16—In the final inspection, castings come from the sand blast cabinet in the rear, are inspected, have points located for machining, are brinelled at the left, and then pass to the table for packing

Fig. 17—Close-up of the equipment employed in aligning the casting and locating machining points

Fig. 18—Castings are packed in cardboard cartons for shipment

veyor and the location of the equipment is well illustrated in Figs. 2 to 5.

Fig. 2 shows the rear view of two of the units and illustrates the start of the operation for the continuous production of the body fin cores. Taking the conveyor loop at the right in Fig. 2, the operator in the center receives the pattern and flask from the rollover draw machine on the conveyor, which is shown passing under the ladder. This woman carefully uses compressed air to remove any sand which may have adhered to the pattern. The ventilator immediately in front of this operator carries away any sand or dirt which may be blown from the pattern plate.

From here the flask and pattern are moved across the end of the conveyor to the second operator, who places a small number of wires on the face of the pattern between the fins. From here the pattern and flask move a short distance to the third station, a vibrating table shown in the center of Fig. 3. Here the metal frame or shroud, shown on the conveyor in Fig. 3, is placed in the center of the flask, with two arms of the pattern protruding through the holes shown in the frame. Core sand is dropped from the chute into the center of the frame and the flask is vibrated. This packs the sand to the correct consistency so that the next step, which consists of placing wires on either side of the cooling fins, shown in Fig. 1, may be accomplished without cracking the sand.

After the wires have been placed in position, the operation being performed by the woman shown on the inside of the conveyor loop in Fig. 3, the mold is moved along to the next station where the center frame is filled with sand and the mold is jolted. This rams the sand inside of the frame. The frame then is drawn, the flask and mold are moved along the conveyor to a point under the core blower, shown in Fig. 3, and the remainder of the flask is filled with core sand by the blowing method.

The core leaving the core blower is shown in Fig. 4. It will be noted that the table of the blower is provided with rollers so that the core may be moved through the blowing operation without difficulty. When the core has been moved beyond the blower, the young woman shown in the foreground in Fig. 4 (*Please turn to page* 199)

Sound Costing

...The Essential Foundation for Gray Iron Prosperity

By JOHN L. CARTER
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UNUSUAL opportunities for the study of the gray iron foundry industry were provided the writer through an association over a period of time with the Office of Price Administration. This study revealed one of the most important industries of the country, producing one of the most essential staple commodities, operating at a miserably low profit level because of poor business management. In spite of a temporary prosperity brought about by the war, I am unable to describe this industry as anything but a sick industry, and the basic disease is poor business management. The basic factor in that poor business management is poor cost accounting.

The true condition of this industry must be judged, not by its showing in abnormal war years, but by its condition in a normal period, and the years 1936-39 are considered to represent a normal prewar period. The OPA surveys conducted in 1942 provided perhaps the most complete statistics that have ever been available on the gray iron industry. They showed that, in the four year period 1936-39, the average profit in the industry was only about 4 per cent and that over 25 per cent of the foundries operated at a loss for the period. A comparison of the profit returns with reports of cost methods indicated clearly that most of the high profit foundries had good cost systems and most of the low profit foundries had poor cost systems. Consequently the average profit level of the industry was pulled down chiefly by those foundries which had poor cost systems.

It is estimated that not more than 25 per cent of the foundries have accurate cost systems; 25 per cent do not pretend to have a cost system; 25 per cent have no cost system worthy of the name, and the remaining 25 per cent have inaccurate cost systems. In other words, out of 2000 foundries, 500 base their prices on guess work and 1000 base their prices on incorrect costs.

The low profit showing has been due primarily to lack of sound cost methods. If the proportion of foundries having sound cost methods had been 75 per cent instead of 25 per cent, the average profit margin in a normal period like 1936-39 would have been doubled; that is, it would have been around 8 per cent instead of 4 per cent. If this additional 4 per cent had been applied to total sales for 1941, which, in spite of OPA's estimate of $500,000,000, should be estimated at about $750,000,000, the gain would have amounted to $30,000,000. That sounds big but it only involves an average increase in price of ⅛-cent and an average decrease in cost of ⅛-cent.

An increase in the number of foundries using a sound cost system would improve the average profit in the industry in the following ways:

1.—Adoption of a sound cost system by any price cutter would bring about an increase in his own prices. This can be demonstrated by numerous examples.

2.—This increase in price by the price cutter would enable several competitors to get a better price for their product and frequently would lead to a price increase on a volume of business much larger than the price cutter's volume.

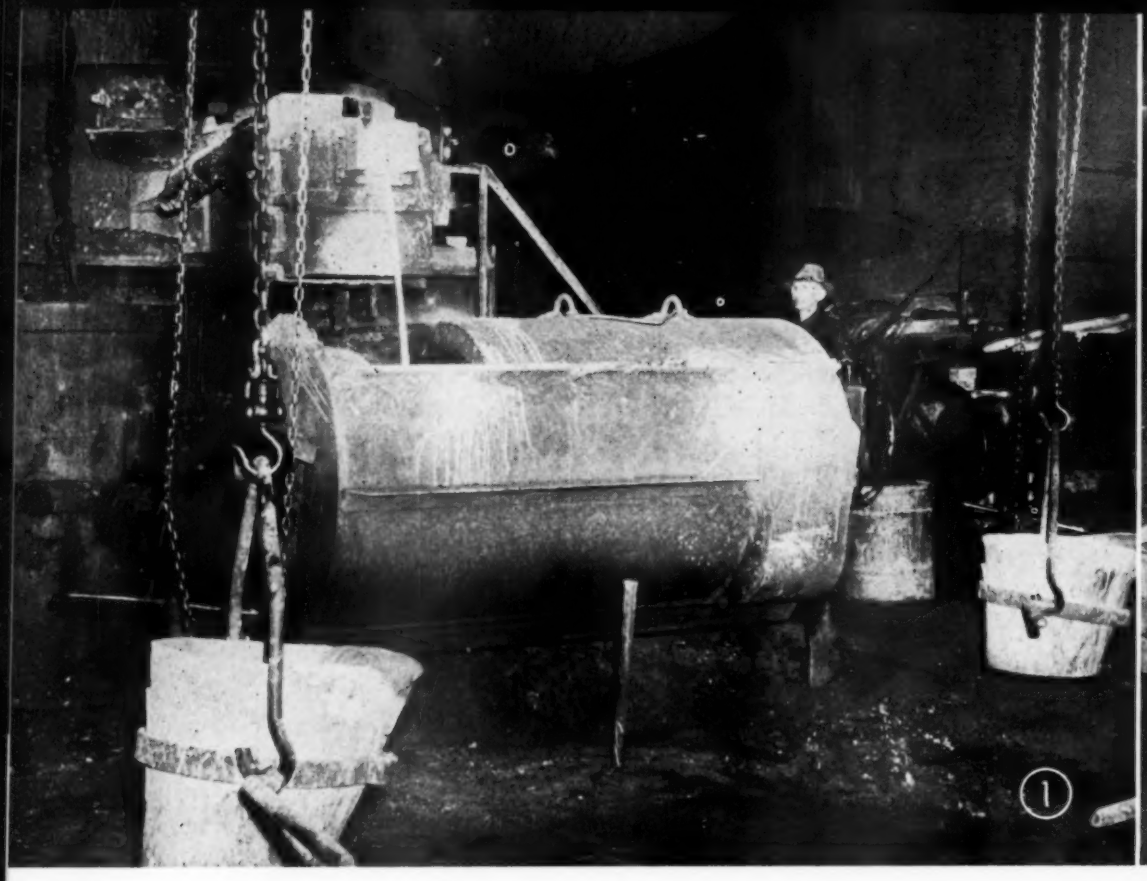
3.—Adoption of a sound cost system by any foundry would lead to a reduction in costs in that foundry, and the increase in profit from cost reduction would be in addition to the increase in profit due to price increases.

4.—Sounder cost accounting would speed up the conversion of gray iron capacity to other uses where this is economically desirable, and this would tend to improve the profit level in the industry.

In regard to the first point, it should be obvious that a foundryman who knows his job costs always has a stiffer back in quoting prices than one who merely guesses at his costs. Plenty of tangible evidence is available to show that the installation of a cost system actually does result in increased prices. Let me cite one case.

I first entered the foundry business as general manager of a foundry which had been losing money. I knew absolutely nothing about the foundry business but did know how to figure costs. Fortunately, the foundry had a good superintendent and produced high quality castings. The only thing that was seriously wrong was pricing. The only thing I did at first was to figure all costs correctly and put the prices where they belonged. We did not lose business of any importance and we started to make money as soon as the new prices became effective. Later other improvements were made in equipment and methods which increased the profit, but the initial change from unprofitable operation was due solely to a change from pricing by guess work to pricing based on accurate costs.

Other instances have been observed where the same thing has occurred. New management has taken over a losing foundry which had no cost system; a cost system has been installed immediately, and in a very short time the foundry has started to show a profit, which has then been increased gradually by other improvements in management methods. (*Please turn to page* 179)



HAND GRENADES made of Gray Cast Iron

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

THE hand grenade is one of the earliest explosive projectiles. Until about the end of the seventeenth century those missiles were thrown by specially trained soldiers called grenadiers. With the development of the musket or rifle the use of grenades practically was abandoned until the Russo-Japanese war when hand grenades were used with devastating effectiveness in the siege of Port Arthur. As might be expected from the fact that it is thrown by hand, the grenade is intended specifically for close-up work in such actions as cleaning out foxholes and machine gun nests, raiding parties, mopping-up operations, etc.

To perform its task of lethal destructiveness in the most efficient manner, the hand grenade must meet certain requirements on weight, concentricity of interior cavity with exterior, fragmentation characteristics, etc. Consequently, while it is a comparatively simple casting, considerable care must be taken in its production. While many are familiar with the appearance of a hand grenade it might be well to touch briefly on a few salient points before proceeding with the description of how they are produced. Made of gray cast iron, the hand grenade is egg shaped. Without the detonating mechanism it is about 3½ inches long and 2¼ inches in diameter at the largest part, and weighs slightly over a pound.

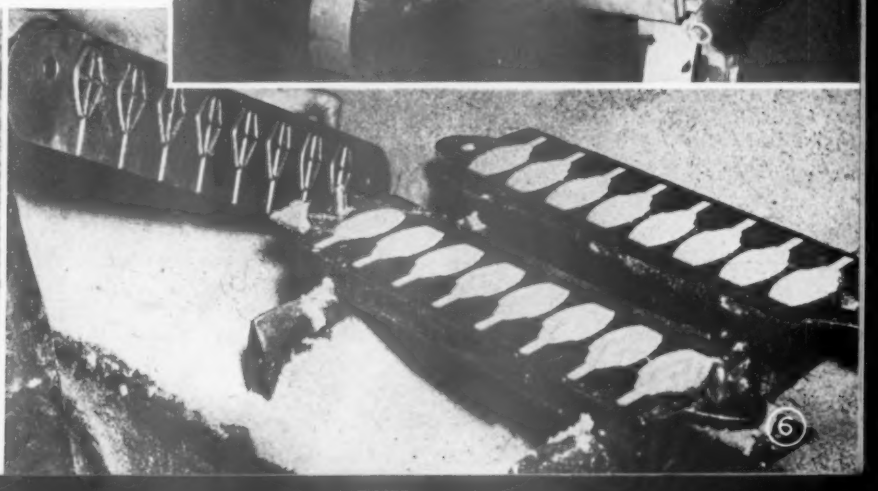
The exterior surface contains grooves which give a corrugated or waffle-like appearance. The grooves provide definite lines of weakness for fragmentation, and consist of 8 equally spaced vertical and 5 circumferential grooves. Thickness at the grooved portions is about ⅛-inch while the remainder is approximately double that thickness. As pointed out previously, the fragmentation characteristics of the hand grenade are quite important since the effective damage caused will depend in a large measure on the number and size of the fragments. While exact data on the specifications for fragmentation are not available for publication, it might be pointed out that the grenade will break into at least 48 pieces about ½-inch square and ¼-inch thick.

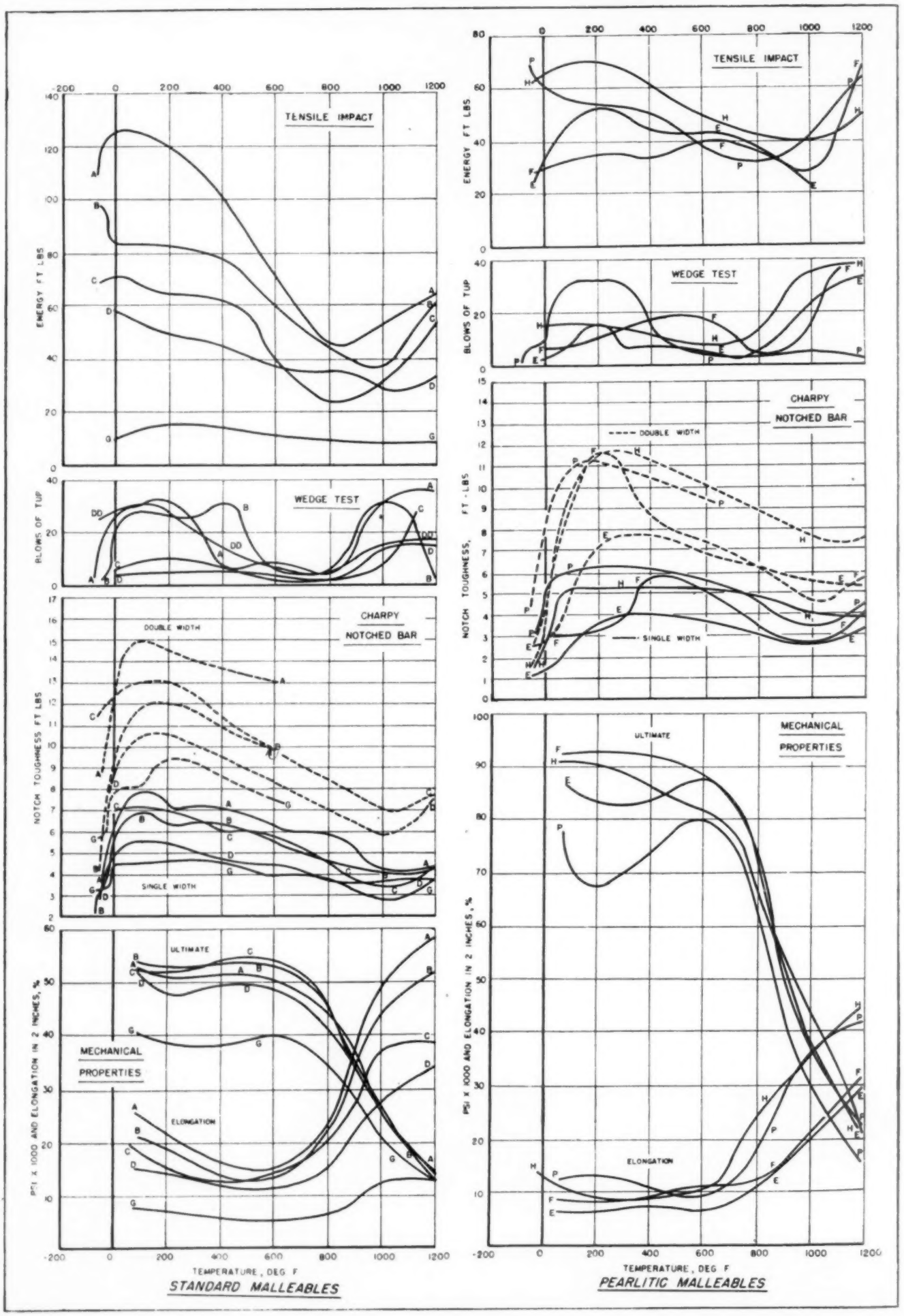
Hand grenades used at present differ somewhat from those used in the first World War in that they are cast with a solid bottom. Those formerly used contained an opening in the bottom as well as in the top, and consequently could be produced much easier since the cores

Fig. 1—Iron from the cupola flows into a barrel type mixing ladle. Fig. 2—Molds in various stages of completion. Fig. 3—Held down by a clamping plate, the molds are poured from a 500-pound ladle. Fig. 4—Molding machine showing arrangement of patterns, and operators setting chaplets. Fig. 5—Core boxes at rear with cores in drier foreground. Fig. 6—Two half core boxes and vent plate used in making cores

were made with prints at each end. With only one opening about 3/8-inch in diameter at the top of the grenade, it is necessary that the core receive additional support in the form of chaplets.

One foundry producing hand grenades is the Dunkirk Radiator Corp., Dunkirk, N. Y., which in addition to its long experience in the production of light section gray iron castings in the form of radiators and boilers, also made grenades during the first World War. Iron for the grenades is melted in a cupola lined to 54 inches. The metal charges weighing 4000 pounds are composed of 50 per cent pig iron and 50 per cent scrap, and are separated by 500-pound coke splits. A front skimming spout is used on the cupola, and the (*Please turn to page* 184)




TENSILE IMPACT
ENERGY FT LBS
WEDGE TEST
BLOWS OF TUP
CHARPY
NOTCHED BAR
DOUBLE WIDTH
SINGLE WIDTH
NOTCH TOUGHNESS FT LBS
MECHANICAL
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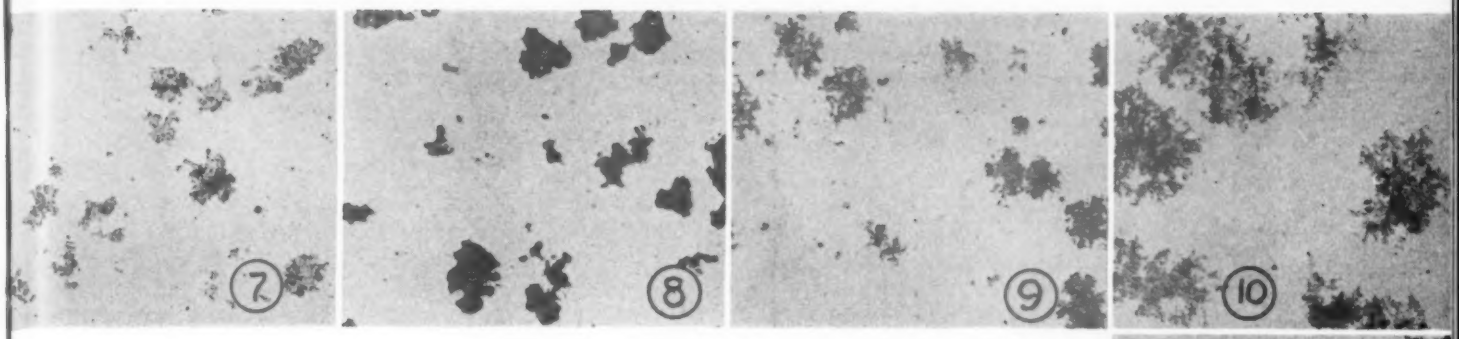
STANDARD MALLEABLES
PEARLITIC MALLEABLES



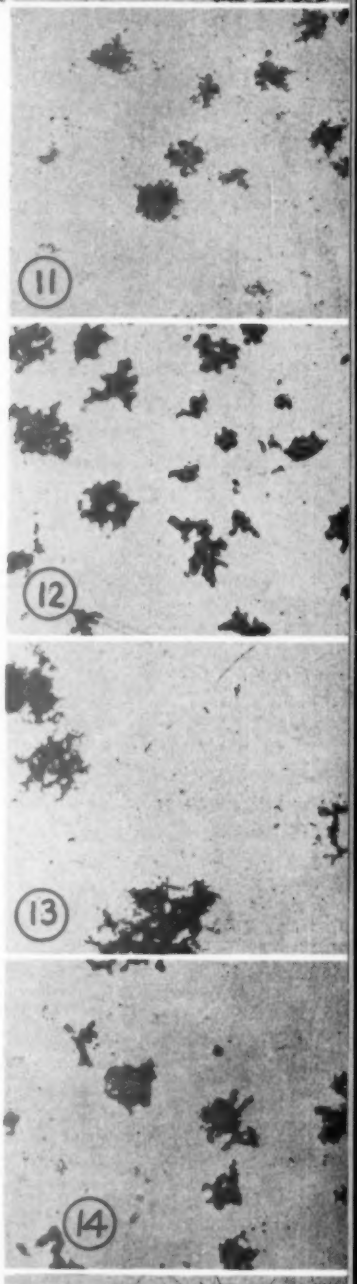
Study MALLEABLE CASTINGS Properties for Military Applications

By O. W. SIMMONS and P. C. ROSENTHAL
Research Engineers
and
C. H. LORIG
Official Investigator
Battelle Memorial Institute, Columbus, O.

FEW tests were made at elevated temperatures on specimens quenched from 1200 degrees Fahr. and the majority of these tests were restricted to the Charpy notched bars. As indicated in Fig. 5, which appeared in the November issue, the test values in all cases fell close to those obtained on untreated bars.

Except for differences in magnitude of test values, which can be attributed to the presence of combined carbon and the mode of distribution of the microconstituents, the effect of elevated temperatures on the properties of the pearlitic malleables is comparable to the effect on the properties of the standard type. This comparison is revealed in Fig. 6 where the composite curves of the standard malleables are reproduced with those for the pearlitic type.

The tensile strengths for the pearlitic malleables decreased from a high value of above 75,000 pounds per square inch at room temperature to about 20,000 pounds at 1200 degrees Fahr. The low point at 200 degrees Fahr. and the high point at 600 degrees Fahr., found in the standard malleables, was not so evident in the pearlitic type, although irons *E* and *P* exhibited that characteristic. In the case of iron *P* the very decided decline



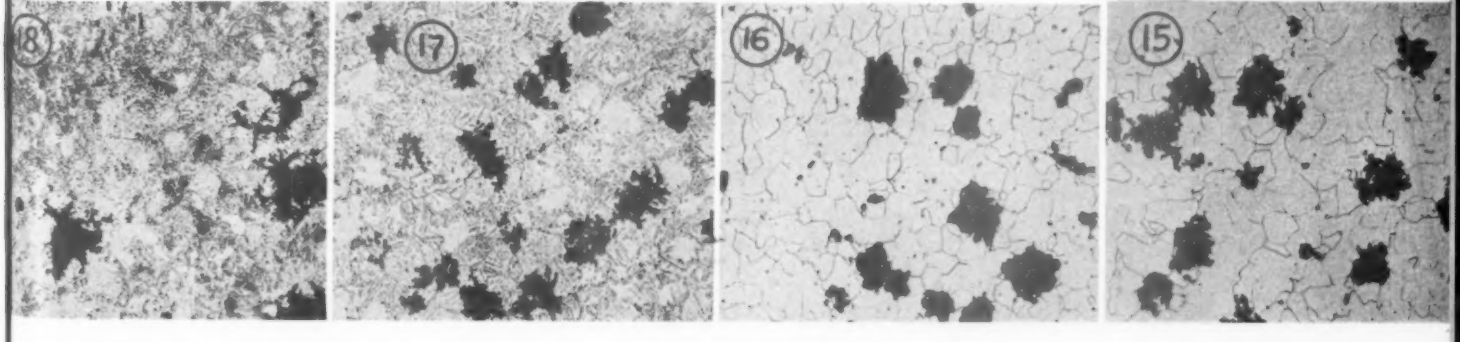


Fig. 6 (left)—High temperature properties of all malleable irons as received. Figs. 7 to 14—Micrographs of malleable cast irons, unetched, 100X. Fig. 7—Standard malleable A. Fig. 8—Short cycle malleable C. Fig. 9—Pearlitic malleable P. Fig. 10—Cupola malleable G. Fig. 11—Standard malleable B. Fig. 12—Short cycle malleable D. Fig. 13—Pearlitic malleable E. Fig. 14—Pearlitic malleable F. Figs. 15 to 18—Micrographs of malleable cast irons, etched in 3 per cent nital, 100X except as noted. Fig. 15—Standard malleable A. Fig. 16—Short cycle malleable C. Fig. 17—Pearlitic malleable P. Fig. 18—Pearlitic malleable E

Editor's Note: This is the conclusion of a series of three articles from a report which is a final presentation covering an investigation conducted by the War Metallurgy Committee with the support of the Office of Scientific Research and Development at the request of the office of Chief of Ordnance. Due to space limitations it was necessary to condense the report by eliminating many tables and curves. However, sufficient have been included to illustrate and amplify the discussion

in tensile strength (about 14 per cent) that took place at 212 degrees Fahr. was not accompanied by any increase in ductility (elongation) but was associated with an increase in the wedge and Charpy impact resistance and with a decrease in the tensile impact properties. Above 700 degrees Fahr., irons *H* and *P* were definitely superior to irons *E* and *F* in ductility, yet the ultimate strengths were nearly alike.

The maximum notched bar values for the pearlitic irons seemed to occur at somewhat higher temperatures than for the standard malleables.

With the wedge test results for the pearlitic malleables, the temperatures at which the minimum values appear were not as fixed as they were for the standard malleables. Iron *P* reached a low point at about 600 degrees Fahr. and did not rise much above it at higher temperatures. On the other hand, the low value for iron *F* occurred at 800 degrees Fahr. and disappeared above 1000 degrees Fahr. However, its resistance below 400 degrees Fahr. was not so high as that of iron *P*. Irons *H* and *E* had minimum points in the wedge test curves at about 600 degrees Fahr.

Like the wedge test, the tensile-impact test gave results that were somewhat erratic, but the trend for these irons was toward a minimum point at 800 to 1000 degrees Fahr.

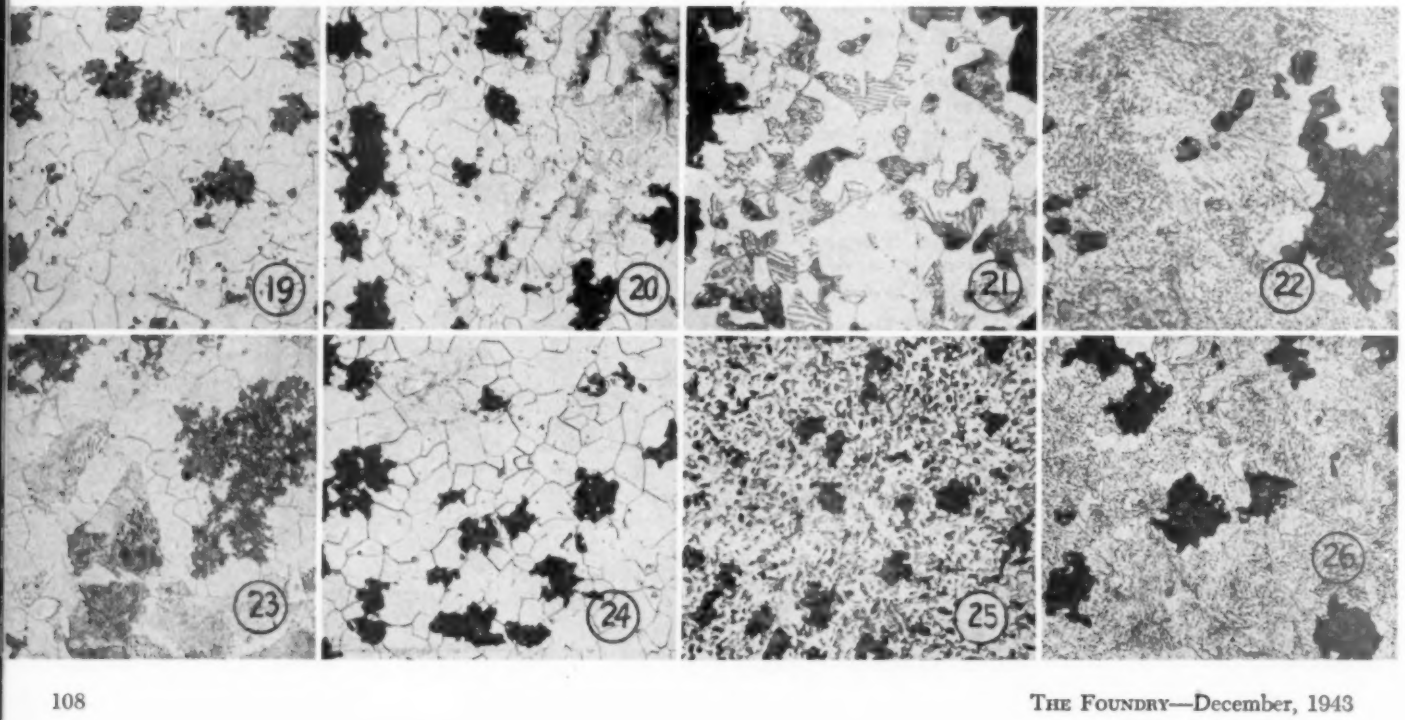
By reference to the photomicrographs, Figs. 7, 8, 11, 12, 15, 16, 19 and 20, it may be seen that the structures of the standard malleables *A*, *B*, *C*, and *D*, were sufficiently similar to offer no explanation for the difference in ductility possessed by these irons except that iron *D* had traces of residual pearlite present which disappeared after a prolonged holding below the critical during the additional second stage anneal (to produce iron *DD*). This pearlite had little effect on the tensile-impact or the static tensile tests, but had a very great embrittling effect upon the transverse bending properties as evinced in the Charpy and wedge impact tests. (See iron *D* and *DD* in Fig. 4 which appeared in the November issue.) Schwartz, Schindler, and Elliott (*Proceedings*, A.S.T.M., vol. 39, page 583, 1939) have stated that, within wide limits, the nodule size of the temper carbon has little effect on either the strength or the ductility of malleable iron.

Fig. 19—Standard malleable B. Fig. 20—Short cycle malleable D. Fig. 21—Pearlitic malleable H, 500X. Fig. 22—Pearlitic malleable F, 500X. Fig. 23—Cupola malleable G. Fig. 24—Short cycle malleable DD. Fig. 25—Pearlitic malleable H. Fig. 26—Pearlitic malleable F

Contained Considerable Coarse Pearlite

The cupola malleable *G* was quite brittle, and this in great part may be attributed to the presence of considerable coarse pearlite and many very large graphite nodules, the latter condition undoubtedly the result of a carbon content of 3.25 per cent. However, there was no evidence of primary cementite. Presumably, the low silicon (0.65 per cent Si) and high manganese (0.57 per cent Mn) content of this iron so inhibited second stage annealing that even after a long period there was still considerable pearlite remaining.

In the case of the pearlitic malleables the structure was very definitely related to the chemistry and to the heat treatment. High manganese content so greatly retarded the progress of the second stage anneal in irons *E*, *F*, and *H* that spheroidite or pearlite were present in the microstructure even after a prolonged anneal just below the critical. Iron *P* was of a different type than the other pearlitic malleables as it was produced by heating standard malleable *B* into the critical region so that re-solution of carbon from the graphite took place in the grain boundaries. Upon subsequent oil quenching, martensitic grain boundaries were produced. Then this material was reheated to just below the critical (*Please turn to page* 202)



CHILLS used on Bronze Castings

By J. W. BRYANT
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USE of chills in sand molds is a phase of modern bronze foundry practice seldom discussed. Suitable chills, properly placed, can do more to assure a good casting than any other single factor involved in the process of forming a mold. A chill may be any device that will hasten the solidification of the molten metal after it enters the mold.

Bronze castings made in cast iron molds are known as chill mold castings. Foundrymen are familiar with the fine quality of these castings. The type of castings that can be made successfully in cast iron molds is limited. Any type of casting can be made in a combination mold, part dry or green sand and the remainder cast iron or other metal. The metal parts are known in the foundry as chills.

Prominent aluminum foundries have employed cast iron or other metal chills in sand molds for many years. Even with this example, the use of chills in the molds for brass and bronze castings is not as widely practiced as it might and should be. A few months ago the superintendent of a foundry pouring over 1,000,000 pounds of metal per month, claimed that cast iron chills could not be used in molds for bronze castings. This surprising statement is in direct variance with our practice where we use hundreds of pounds of chills a day and where often 75 per cent of the mold face may be cast iron chills.

Chills are employed principally on castings having abrupt variations in metal thickness; for example, light side walls with heavy bosses, thin gears with heavy center hubs, etc. Chills at first were employed to take care of heavy sections that could not be risered or fed properly on account of their location. Today in many instances we use chills in preference to risers, even where risers might be applied. Experience shows that the effect of a chill is constant and dependable.

To Prevent Shrink and Crack

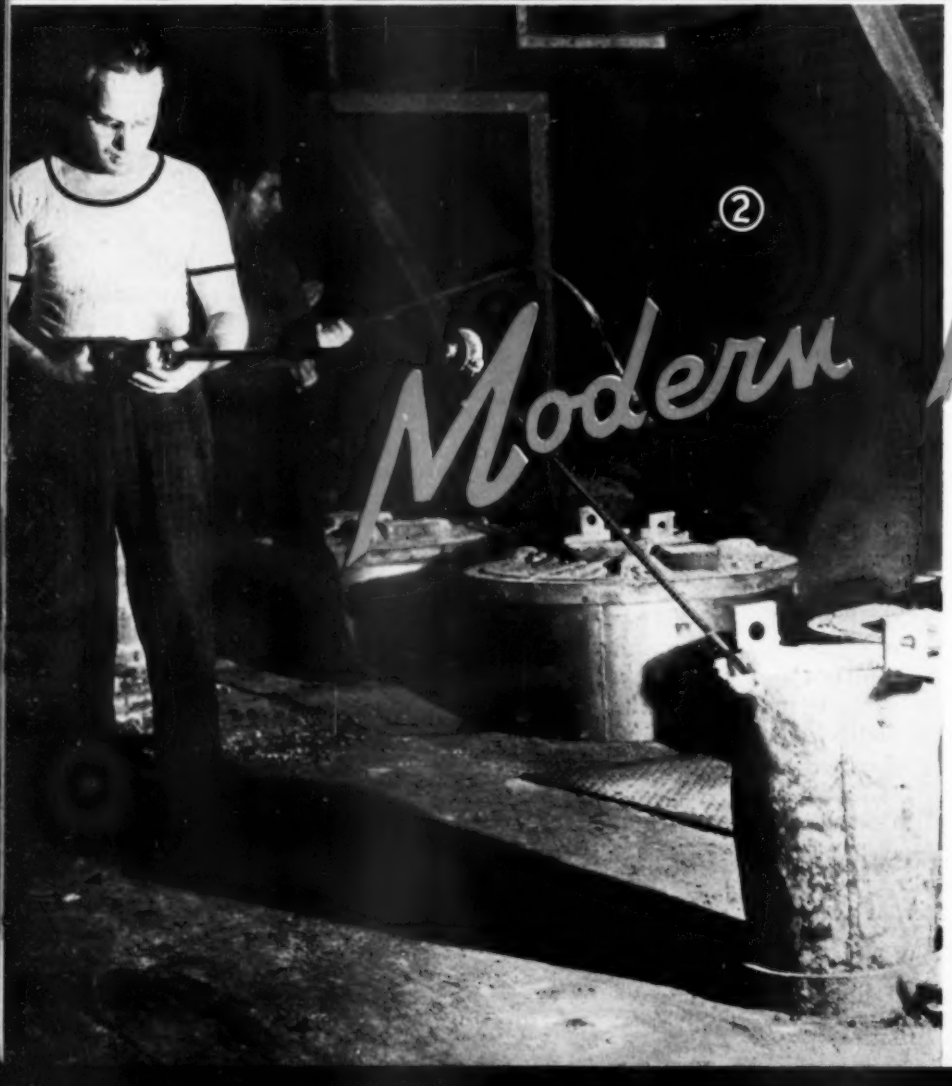
Consider a typical example, a gear blank casting 34 inches in diameter and 1-inch thick, with a center hub 6 inches in diameter and 3 inches deep with a 1½-inch core. The problem is to prevent both internal shrinkage in the hub and a shrink crack at the junction of the hub and web. The casting would be gated from the outer rim. Metal would pass through the 1-inch thick section and flow into the 6-inch diameter hub in the center. If a riser is placed on top of the hub to serve as a feeder, the metal would have to travel at least 30 inches from the point where it entered the sprue to where it enters the riser. Obviously, by that time the metal is so cold that it will freeze and set in the riser before the riser can perform its anticipated function of feeding the hub. The practice of pouring hot metal into the top of a riser in an attempt to keep it liquid is known to practically all foundrymen. At best, the method is sloppy. Either the pot of metal must be transferred rapidly from the sprue at the edge of the mold, to the riser in the center, or a standby pot must be used to fill the riser. Even with experienced help, the metal may be dribbled or splashed into the riser opening. Results are uncertain. If the riser fails to function as a feeder, it does more harm than good, and also means a waste of metal.

Chills applied to the center hub will assure a perfect casting, and the production cost will be less than when riser is used. Chills for the gear casting hub can be made as a bushing in the iron foundry. This bushing, 6 inches inside diameter, 7 inches outside diameter, and as long or slightly longer than the drag hub on the gear pattern, is split into two or three sections to facilitate removal from the casting. The chills are set around the pattern hub and rammed up in the drag where they form the mold surface around the hub. They also form that part of the mold surface at the junction of the hub and the web of the gear casting.

The cast iron chills absorb and carry off the heat from the metal in the hub so that this part of the casting solidifies more rapidly than the remainder of the metal in the web and rim. The hub metal is solidifying while the remainder of the casting is still in a liquid condition. Beneficial pressure of the metal in the sprues is transmitted to the hub to supply any needed feeding.

Ordinarily, the part of the casting that forms the immediate junction of the hub and web would be liable to develop draw cracks. Heat from the body of the hub and the body of the web would tend to keep this junction hot. It would be the last section to set, and therefore would have little strength to resist the pull of the remainder of the casting which causes the cracks. Chills eliminate this tendency.

The gear casting used as an illustration presents a comparatively simple example of chill application. Many castings weighing 30 pounds will call for the use of 30 pounds of chills. Some chills are plain or flat, while others are of irregular shape to fit the contour of certain parts of the pattern. Patterns for the chills are made at the time the pattern for the regular casting is constructed. Where the chills are applied (*Please turn to page* 168)



Modern Methods IN CASTING MAGNESIUM

By F. A. FOXALL
Assistant Manager of Foundries
Eclipse-Pioneer Division
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Teterboro, N. J.

DEVELOPMENT of magnesium castings to their present stage of perfection has brought many new problems in the choice of molding sands. Years ago, when magnesium first was being cast in sand, not too much emphasis was placed on the type of molding sand used, and consequently foundry rejects were high, due to defects like burns and blows. Today, we are confronted with much more rigid inspection requirements of magnesium castings. These have been brought about by the much wider application of magnesium to aircraft, with the introduction of Army and Navy specifications, and also by the almost universal use of x-ray control of aircraft castings. This has led to increased knowledge concerning types and treatments of sands.

The principal types of magnesium alloys used in the United States are Dowmetal "C" and Dowmetal "H". The variation in these alloys is in the zinc and aluminum content, but the sand problems of each are identical. To be used in magnesium castings, a sand must have the following qualities:

1. High permeability. The chief reasons for this quality being: (a) That magnesium alloys are so light the sand must be open enough so that there is no back pressure from the air in the mold, when the metal flows into the mold cavities; (b) The open sand is required so the gases will escape from the sand and will not be entrapped in the metal. If the gas does not escape from the metal, a blow or a gas pocket is the result.

2. Magnesium molding sand must be used with as low a moisture content as possible. This low moisture content tends towards a more uniform sand and fewer gases and vapors when the metal is poured into the mold.

3. Sand must have medium green strength and a low dry strength. Modern aviation castings are usually intricate in design, and a green strength is required to hold an intricate mold impression. A low dry strength, aids in shaking the castings out of molds after they have been poured.

Use Natural and Synthetic Sands

In general, two types of sand are used in magnesium foundries. One is the natural sand of the Albany type, and the other is the so-called synthetic molding sand. In the natural sands, the average grain fineness runs from 100 to 150 with a permeability ranging from 25 to 45. Roughly speaking, these sands contain about 10 per cent clay, and they usually require about 6 per cent moisture. With the synthetic molding sands, the fineness is usually from about 65 to 100, and the moisture content will range from 3 per cent to 4 per cent. Both types of sands must be treated with a chemical agent to inhibit the action of the moisture upon the hot metal. This agent consists chiefly of ammonium boro fluoride and ammonium acid fluoride, and must be applied in sufficient quantities to prevent any oxidation of the metal in the mold. As the sand is used, this agent loses its power, and makeup must be added to preserve its inhibiting action.

The gating and risering of magnesium castings is a topic of lengthy discussions and varied opinions. Although definite underlying factors are involved, it is doubtful if any two foundries have exactly the same ideas on which is the proper way to gate any one particular casting.

To avoid turbulence in the mold, the (*Please turn to page* 188)

This is the second and concluding installment of Mr. Foxall's article. The first of the series appeared in the November issue

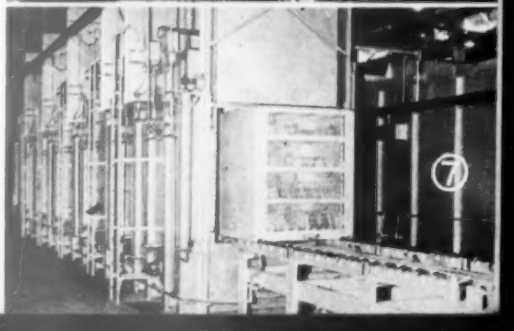


Fig. 1—Pouring magnesium castings on a continuous conveyor. Fig. 2—Checking metal temperatures. Melting under laboratory control. Fig. 3—Burring operation to remove fins and surplus metal. Fig. 4—Removing gates and risers with bandsaw. Fig. 5—Snagging operation. Note protective oil spray and conveyor installation. Fig. 6—Pulling test bars to determine tensile strength. Fig. 7—Modern continuous heat treating furnace for magnesium castings

New Steel Foundry Makes NAVY CASTINGS

(PART II)

IN CERTAIN instances, in the large steel foundry recently erected and placed in operation by the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., steel flasks are employed as a retaining wall or curb around assembled molds which present some degree of hazard in their ability to resist static pressure when filled with liquid steel. In other instances the flasks are built up around tall jobs, as shown in Fig. 3, where the pit is not deep enough. For the general run of castings, the hard, cement-bonded molds are simply clamped together and set up on the floor or assembled in pits surmounted by binder bars anchored to sturdy steel loops in the walls.

Five pits are available in the south molding bay, one 12 x 26 x 12 feet deep, one 12 x 26 x 10 feet deep, one 20 x 28 x 6 feet deep and two 20 x 20 x 6 feet deep. In the other main molding bay a pit 20 x 60 x 6 feet deep was constructed specifically for molding ship propellers. The space is sufficient for three molds for the 18½-foot propellers used on the standard type of vessels known as Liberty ships. In addition to the upright steel loops in the walls, steel members with slots for anchor bolts are bedded in the bottom of the pit. With this arrangement, wheels of any size, up to the maximum, may be handled readily.

All the pits are double walled with a sump, or chamber near the bottom of the wall to prevent any water from accumulating on the pit bottom. An elaborate system of sewers under the building renders this a rather remote contingency. This is just another item in the general safety factor which pervades the entire establishment. Typical binder bars employed for anchoring molds in the pits are shown in Fig. 6. Each unit includes two longitudinal members, flanged top and bottom on the outside, connected at the ends and also at 12-inch intervals throughout the entire length by full depth transverse ribs. Hollow steel blocks in various lengths for supporting the ends of the long steel binder bars, are shown in the same illustration. Vertical slots in all pit side walls permit the insertion of bulkheads to convert the pit into two or more separate chambers.

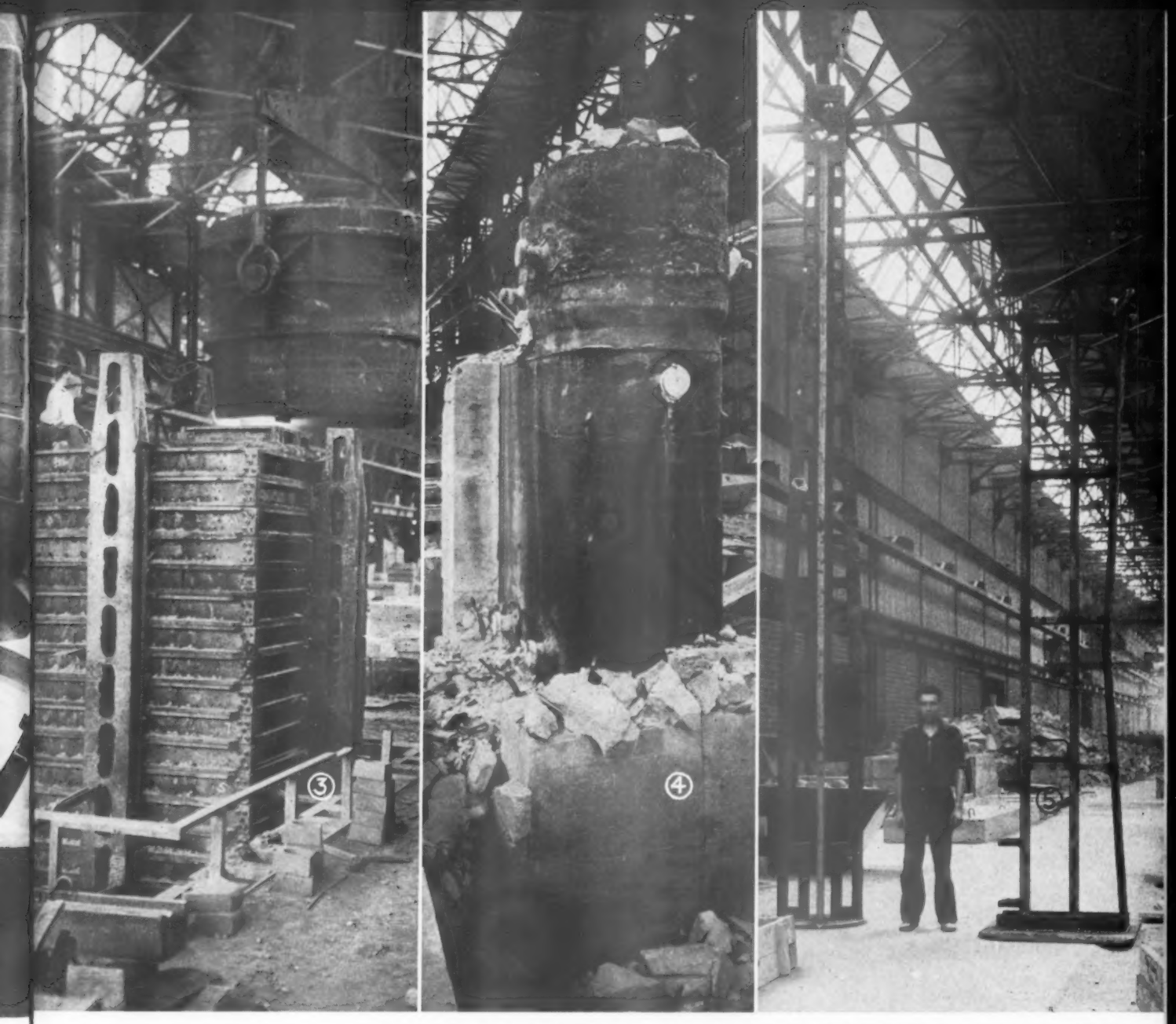


Fig. 1—Method of shipping some of the large awkward-shaped castings presents a problem. Fig. 2—Showing the risers and gates on a partly assembled mold. Flat chills on the side wall take the place of brackets. Fig. 3—Steel flasks and binder bars reinforce molds for large castings poured in a vertical position and extending above the pit. Fig. 4—The mold breaks away readily and leaves a clean skin on the casting. Trunnions on the riser facilitate handling in the cleaning room. Fig. 5—Built-up steel arbors which support the cores in the casting shown in Fig. 4

In some instances the sand is rammed directly around the pattern in the pit. In other instances, the sand is rammed in a number of large coreboxes on the floor. The dried blocks of sand then are assembled in proper order on the floor of the pit. Particular method adopted in any given case depends on several factors that test the skill, ingenuity and resourcefulness of the supervisory force. Occasionally priorities, available space and rigging and the men to make the job induce the adoption of one method. Under another set of conditions, the method might be different. This condition of course prevails in all heavy work jobbing foundries and is regarded as all in the day's work.

Ship anchors in several sizes and conforming in general features to the casting shown in Fig. 11 are made in large numbers. The pattern is split through the center of the hub and flukes, and since it is symmetrical only one half pattern is required in making the mold. The core print for the shank opening and the sinkhead pattern are detachable. One is attached for the drag half of the mold, and the other is placed in position for the cope half. The double branch gate which delivers metal to the hub at both sides of the core is part of the drag pattern. The sprue, of course, is formed in the cope.

The half pattern is mounted on the bottom of a sturdily built corebox, tapered about 1-inch to the foot for easy removal. The box is placed on the table of a large jolt ram, rollover, pattern draw machine and filled with sand from a chute connected to an overhead bin. Lifting hooks and a few rods are placed in proper position and the sand is jolted into a solid compact mass. A steel bottom plate, planed on the face and reinforced on the back with longitudinal and transverse ribs, is adjusted in place and the

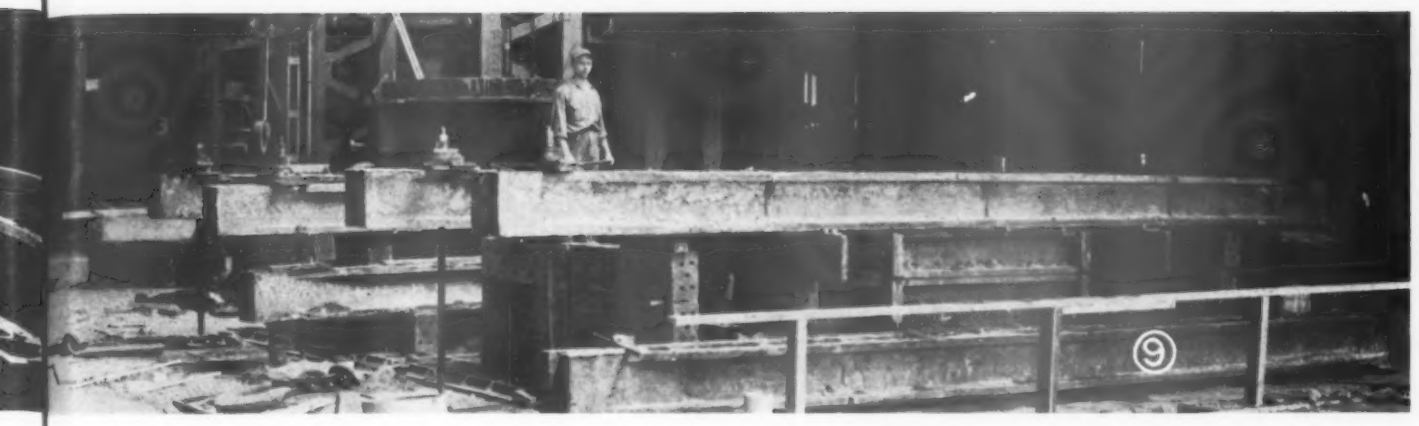
Figs. 6 and 9—Long, hollow, rigid steel binders attached by bolts to anchors in the concrete walls of the pit bind the various parts of the mold firmly together to resist pressure when filled with molten metal. Fig. 7 — Method of clamping molds on the floor. Fig. 8—Molds for two castings built in one pit

load is swung through an arc of 90 degrees during which the corebox is inverted. A piston in an auxiliary cylinder pushes an equalizer table up against the bottom plate. The clamps are released and plate and core are lowered to the level of the roller runout table from which they are picked up by a crane and placed at some convenient point on the floor where they remain until the block of sand is hard and dry. Lifting hooks are necessary only on the face or joint side of the drag cores. Hooks are required on the face and also on the back of the cope cores, since they must be lifted from the plates and then turned over before they are placed in position on the drags. After cope and drag are clamped together, the joint is daubed with mud and a runner cup is placed over the sprue opening. The molds usually are set up in groups and require no outside reinforcement of any kind.

Manufacture of bottom or core plates formed part of the regular routine while the shop was swinging into production. A skeleton pattern was set up level inside a flask or a temporary wood frame. Sand was rammed under and around the pattern in the usual manner and scraped off flush to form a flat joint around the outside of the pattern. Sand on the inside of the pattern frame was scraped off flush with the tops of the reinforcing ribs. The pattern then was removed. In the meantime a plain, rectangular plank frame 8 to 10 inches high was set up on a special section of floor 20 x 40 feet surfaced with cement and as true and level as the surface plate in a machine shop. The block of sand rammed inside the frame and provided with lifting hooks was allowed to stand until it became rigid and then was transported into an adjoining bay to serve as a cope on the plate mold.

A slightly different technique is employed in making the mold shown in Fig. 7. A number of special steel clamps are set up on the floor and the pattern is adjusted in proper position with blocks and wedges. The clamps extend from side to side. Wood planks on edge are nailed together to form a box or container corresponding to the drag flask employed in orthodox foundry practice. The wood frame is wedged against the upright clamp members. Sand is rammed under and around the pattern and scraped off flush at the joint line in the ordinary manner. The pattern and planks are removed and the mold remains open until the cement-sand mixture has solidified. The upper or cope half of the mold is made in sections in a number of coreboxes in another bay of the foundry where the sand from an elevated hopper falls into them from a chute. In this manner cope and drag may be made simultaneously and several men can work on the job without interfering with each other.

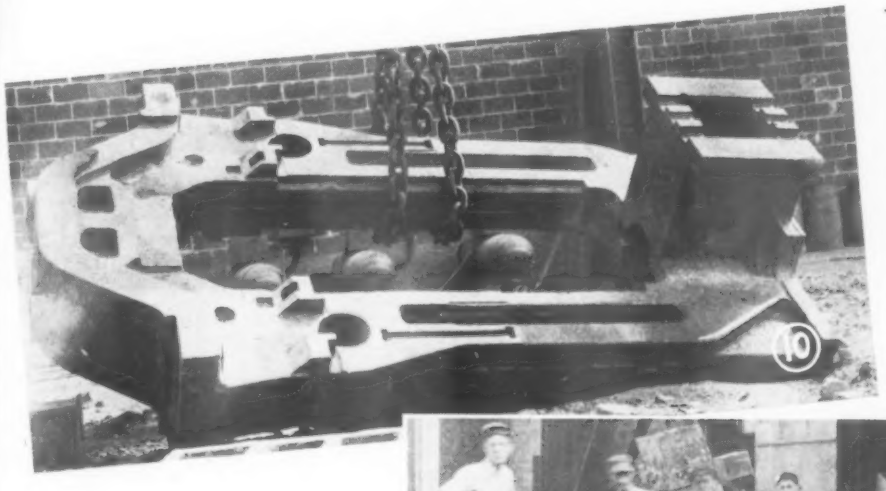
When the cope cores are ready they are rolled over so that the face side is down and then are placed in proper



position on the drag. They are guided into position by the outside walls which coincide, and by the joint line on the inside plainly visible through the large riser openings and through the opening in the end of each cope core as it is lowered into place. The completed mold is bound together by flat steel bars extending across the top of the cope and latched into the gaps near the top of the upright clamps. Wedges also are driven between these same upright members and the mold body.

Another variation in molding method is shown in Fig. 8 where two different shaped molds are constructed in one pit. One end and one side of each mold is built firmly against the pit wall. The other side and the other end are formed inside a temporary plank wall or crib. The part of the mold built against the pit wall is not disturbed during the construction of the mold. The remainder inside the wood wall is built as a drawback and is provided with hooks for lifting. However, it differs from the usual style drawback in that no bottom plate or arbor is required. This form of construction is necessary to release the pattern which, in the majority of instances, has one or more undercut areas which would prevent removal of the pattern in a straight lift.

After the sand has solidified, the crane chains with turnbuckle extensions are attached to the hooks. The chains are pulled up tight and then the molder and his helper exert a swaying action (*Please turn to page* 205)



Figs. 10 *and* 12—*Exceptionally clean skin and absence of fins around the core prints characterize large steel castings. Fig.* 11—*Showing type of sprue, gates and riser employed on steel anchor castings*

LADLE INOCULATION

Improves Gray Iron Properties and Structure

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Westinghouse Electric & Mfg. Co.
East Pittsburgh, Pa.

IN ORDER to determine the closeness or density of the metal when poured into heavy sections, in some cases 8x8x6-inch blocks were poured into cores, sectioned through the center, brinelled, and examined visually for porosity.

Fluidity tests were made on a "star wheel" casting. Four of these castings were grouped around a common central downgate and so arranged that a different gate size was used on each casting. The smallest gate that would successfully pour a casting was used as an indication of metal fluidity.

This particular "star wheel" casting was chosen for this test as it has proved troublesome to cast. On account of its proportions there is a considerable tendency for a shrinkage defect, known as a draw, to occur in the heavy hub. For successful production casting, a hole is cored through this hub in order to reduce section thickness. It was thought that some indication of the effect of inoculation on "drawing" could be obtained by the use of the uncored casting.

During the course of the investigation, however, it was discovered that this defect was not a true shrinkage defect as had been thought, but was in reality a gas defect

Fig. 10—Transverse deflection. Fig. 11—Transverse deflection with SiMnZr and FeSi additions. Fig. 12—Tensile strength with SiMnZr additions. Fig. 13—Transverse strength with SiMnZr and FeSi additions. Fig. 14—Tensile strength. Fig. 15—Hardness with SiMnZr and FeSi additions. Fig. 16—Hardness. Fig. 17—Transverse strength

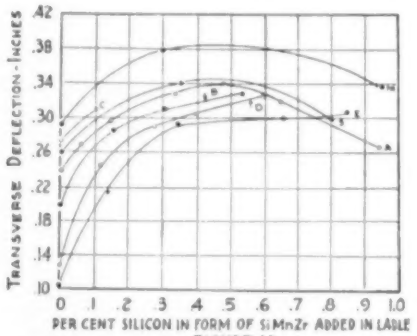


FIGURE 10

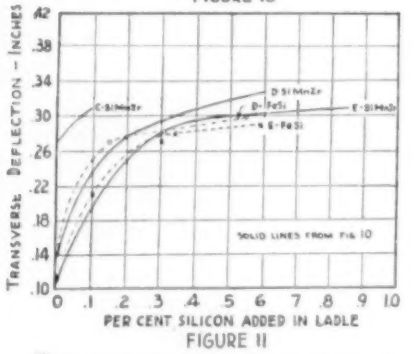


FIGURE 11

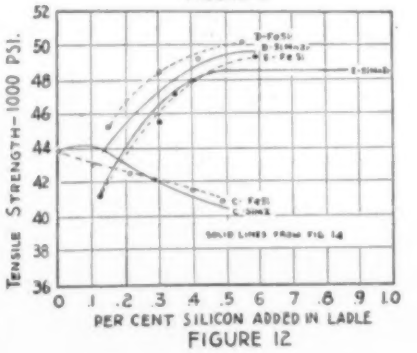


FIGURE 12

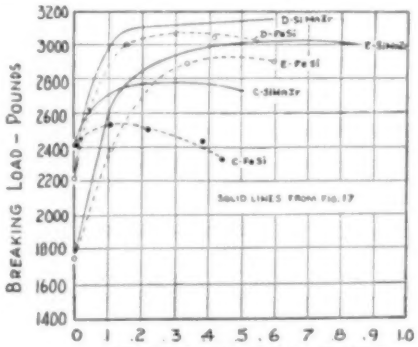


FIGURE 13

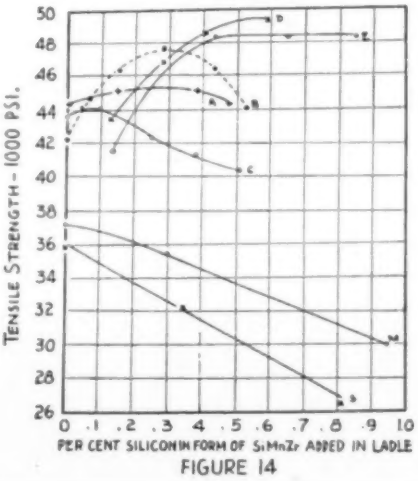


FIGURE 14

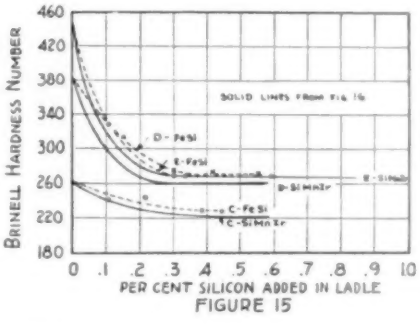


FIGURE 15

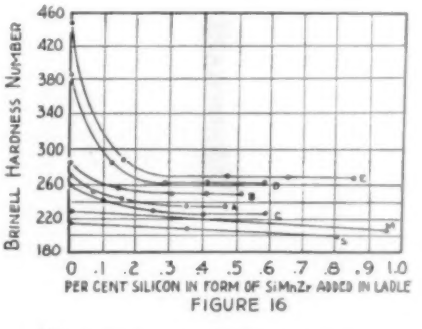


FIGURE 16

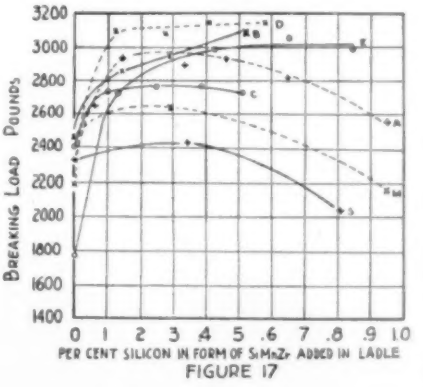


FIGURE 17

This is the concluding installment of two articles on ladle inoculation. The first appeared in the November issue.

that could be eliminated by the use of a high permeability sand. Therefore, the early work regarding the effect of inoculation on "drawing" has been omitted from this report, and this casting used merely to compare qualitatively fluidity characteristics. There are available more accurate fluidity tests; 26 of these were not used in this investigation, however, since only an indication of the effect was desired.

One new term has been developed to report the results of this investigation. Si^x denotes the percentage of silicon added in the ladle; this value is determined by the increase in silicon content of the subject metal over the silicon content of the base metal. For example, 0.5 Si^x refers to a ladle addition sufficient to give the base metal an increase of 0.5 per cent in silicon; that is, from 2.30 per cent silicon to 2.80 per cent silicon.

Unless otherwise noted, all tensile strengths are in pounds per square inch (p.s.i.) in a 1.2-inch section, hardness in brinell numbers (BHN) in a 1.2-inch section, transverse strengths in pounds required to fracture a standard 1.2-inch diameter arbitration bar on 18-inch centers, and transverse deflection in inches.

Section sensitivity is defined as the spread in hardness obtained by pouring the same metal into castings of different section thicknesses. This property is illustrated well in *Figs.* 4 to 9 which appeared in the November issue.

The pilot tests that were run during the course of the investigation are not reported since they only served to guide the eight main series of tests that are reported herein. The results obtained from each series were tabulated and several curves made up. The lengthy tabulations (including 120 chemical analyses, 180 tensile tests, and 150 hardness tests) and the several curves for each series have been deleted from the report in the interest of brevity. Rather than plotting (*Please turn to page* 194)

Fig. 18—*Transverse deflection.* *Fig* 19—*Transverse strength.* *Fig.* 20—*Tensile strength of production heats.* *Fig.* 21—*Variation of tensile strength.* *Fig.* 22—*Hardness.* *Fig.* 23—*Variation of tensile strength*

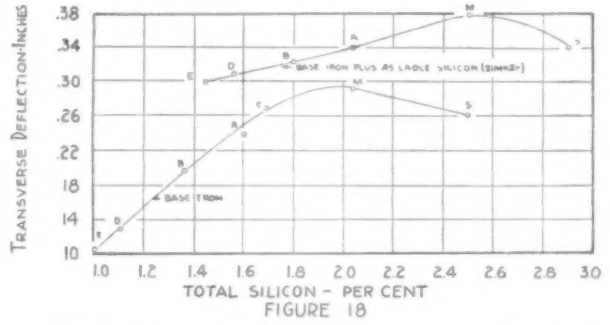


FIGURE 18

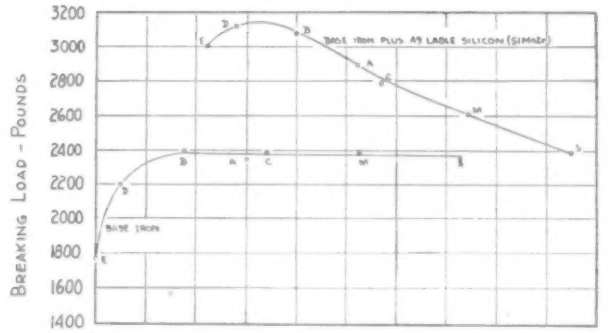
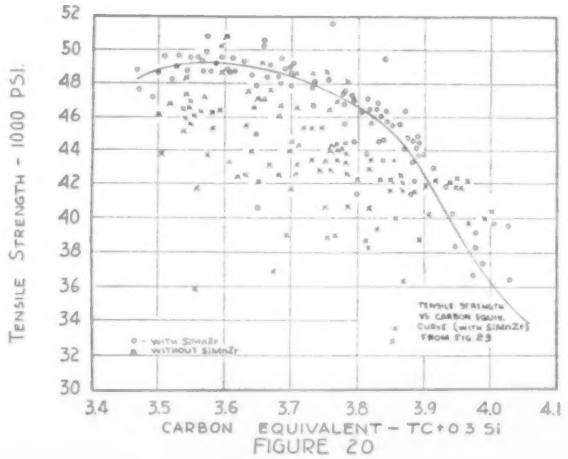
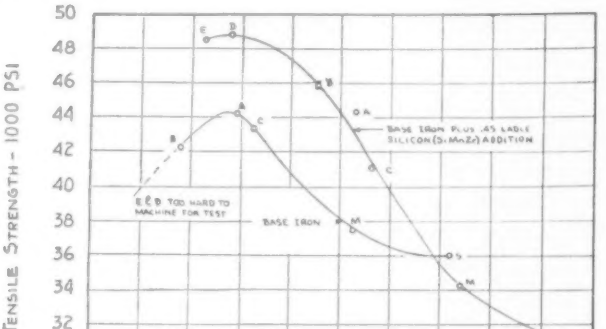


FIGURE 19


TENSILE STRENGTH - 1000 PSI
TENSILE STRENGTH VS CARBON EQUIV. CURVE (with SiMnZr) FROM FIG 23
o - WITH SiMnZr
x WITHOUT SiMnZr
CARBON EQUIVALENT - TC + 0.3 Si
FIGURE 20


TENSILE STRENGTH - 1000 PSI
BASE IRON PLUS .45 LADLE SILICON (Si MnZr) ADDITION
B & D TOO HARD TO MACHINE FOR TEST
BASE IRON
TOTAL SILICON - PER CENT
FIGURE 21

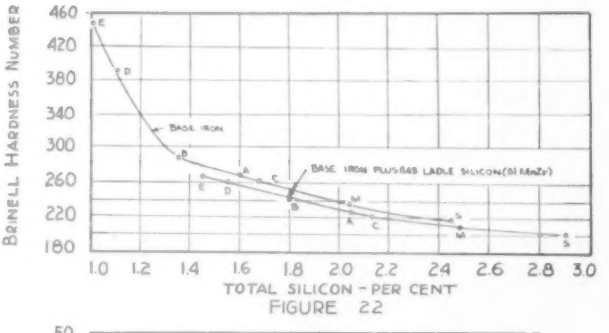
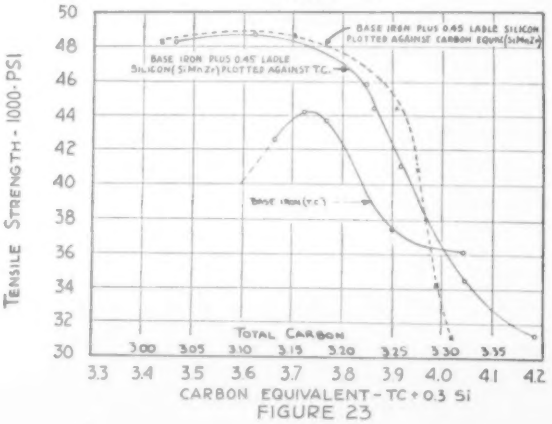


FIGURE 22


TENSILE STRENGTH - 1000 PSI
BASE IRON PLUS 0.45 LADLE SILICON PLOTTED AGAINST CARBON EQUIV (SiMnZr)
BASE IRON PLUS 0.45 LADLE SILICON (Si MnZr) PLOTTED AGAINST TC
BASE IRON (TC)
TOTAL CARBON
CARBON EQUIVALENT - TC + 0.3 Si
FIGURE 23

Wants Iron With the Maximum Shock Absorption Capacity

Q.—The cast iron we use in our general run of castings has a tensile strength from 30,000 to 36,000 pounds per square inch with the following composition: Silicon 2.30 per cent, total carbon 3.20 to 3.30 per cent, manganese 0.50 to 0.60 per cent, sulphur 0.100 per cent and phosphorus 0.45 to 0.55 per cent. Can you tell us what composition will produce an iron with the maximum shock absorption?

A.—Without specific data on the section thickness and other information on the type of castings you have in mind, it is difficult to give specific compositions which might meet the requirement of maximum shock resistance. The only suggestions we can make are of a general nature, and include the following: The iron should be as low in phosphorus as possible, say not over 0.30 per cent, and preferably lower. It also should be fairly low in total carbon, and one which will produce a fine-grain structure. The combined carbon should be between 0.40 to 0.50 per cent.

Will Melt Steel in Pit-type Oil-fired Crucible Furnace

Q.—We are contemplating the installation of an oil fired crucible pit furnace 300-400-pound capacity for melting nonferrous metal. Occasionally we should like to melt a heat of steel for quick repair jobs. What is the best type of blower for this furnace and how do we calculate the proper volume and pressure of air required to melt the different metals?

A.—Your problem is interesting in that many men have wished to use nonferrous furnaces for melting ferrous metals. Some have been successful to a certain extent so long as they confine themselves to cast iron, or where they have used electric furnaces. This particular problem presents two phases: 1—To melt regularly 300 to 400 pounds of nonferrous metals and 2—To melt an occasional heat of steel. This means a furnace that is a compromise between the ideal for either one and this in turn may handicap the production of either of the two products. We suggest you refer the problem to furnace designers and manufacturers whose addresses appear in THE FOUNDRY.

Certainly a highly efficient combustion arrangement will be required to melt steel in a crucible at a temperature to insure proper fluidity to pour castings. Modern technique in furnace design and construction can produce a furnace that will serve your purpose, but your principal trouble will be in trying to melt steel heats of less than 300 pounds. A small crucible will be at a great disadvantage. We do not feel that we are qualified to advise on this subject in view of the rapid advance in the understanding of combustion of the liquid fuels and the improvements in burners. Even if we were to supply information on blowers, etc., we are not in position to describe the special features and advantages in the newer types of burners. This information must come from the manufacturers of melting equipment.

Procedure for Breaking Large Castings May Cause Trouble

Q.—We have been experiencing some difficulty in melting large scrap castings, and wonder if it can be due to the method of handling. The alloy is 85-5-5-5, and we place the large castings on top of our oil-fired furnaces until they are cherry red. Then they are removed, and broken up into pieces small enough to charge into No. 225 crucibles. It has been suggested that the described procedure may result in oxidized metal which causes the trouble.

A.—Your method of handling castings too large to be charged into crucibles is more or less standard practice in brass foundries which do not have equipment to break them up, and although it is not recommended, little trouble seems to have been encountered. However, if the fuel oil you are using is high in sulphur you will run into trouble from the red hot metal absorbing some sulphur. Also under no circumstances should the alloy being heated or allowed to remain over the flame until it begins to melt since then it will quickly absorb large quantities of gas.

A much better procedure would be to get a large power-operated shear which could be used to cut up the castings into suitable size, or construct what is commonly termed a "skull cracker" which simply means some kind of hoisting device which raises a heavy ball or other weight up to a height of say 15 or 20 feet and automatically releases the weight to drop on the casting and break it. Perhaps you might be able to take the castings to some other plant in your neighborhood which might have such equipment available.

If it is necessary that you continue heating the castings to break them up, it might be well to melt the pieces and pour them into ingot, rather than adding the pieces to regular heats. Also it might be a good idea to melt down some of the pieces, pour into bars, and determine

the chemical composition, especially looking for sulphur. Perhaps your trouble may result from insufficient phosphor-copper in deoxidizing the melt.

Gray Iron Castings To Resist Elevated Temperatures

Q.—We shall appreciate your advice on a suitable grade of gray iron for coke oven doors and covers. The price is low, and we cannot use alloys. In this district the usual type of cover is a flat disk about 1¼ inches thick with a small hook on top for lifting purposes. Some prefer covers with four radial ribs on top while others claim that the ribs make the covers warp and get out of shape quickly.

A.—It is unfortunate that you are under the handicap of getting business on a strictly price basis, and our first reaction is to suggest that you forget about those jobs, and devote your time to securing business on which you can make a profit. One way to overcome the particular situation would be to make a quality product, and submit it for test—keeping close account of its life. Economy in operation probably would prompt the customer to adopt the improved castings at a suitable price in future orders. Elementary logic should show any one that a $5 casting with a life of 6 months is cheaper than half a dozen $1 castings which have to be replaced every month.

So far as the design of the covers and doors is concerned, we do not believe that any one has particular advantage over the other since heat applied constantly to one side will cause warpage due to the difference in temperature gradient between the hot and cold sides. For a plain iron to withstand elevated temperature, the silicon should be low, say from 1.0 to 1.5 per cent, and the structure fine grain. Use of a considerable amount of steel scrap in the charge will enable you to obtain such an iron.

Has Trouble with Leakage in Gray Iron Tire Molds

Q.—We have made a number of gray iron castings which are used in equipment for retreading tires. Some have been rejected due to leakage though a porous section about ½-inch wide and 2 inches long. How can we salvage the rejected castings?

A.—Several procedures are available to salvage the castings you mention. They involve the use of liquid fillers which are forced into place under pressure so that they fill the voids. After releasing the pressure the excess liquid is drained out, and then the castings are heated which changes the liquid to an insoluble compound. The fillers, which are described in the advertising pages of THE FOUNDRY, are proprietary materials composed of synthetic resins, and are designed for the purpose outlined.

An old time method which was used with some degree of success employed a solution of sal-ammoniac. Action of the sal-ammoniac formed hydrated iron oxide which was deposited in the pores. Drying changed the hydrate into solid iron oxide which filled the fine pores, and eliminated leakage. However, we believe that the use of the previously mentioned proprietary compounds will be found more successful.

Iron Oxide Added to Core Sand To Retard Collapsibility

Q.—We noticed in a recent article in reference to brass molding that powdered iron oxide is added to the core sand mixture to prevent eating in or whiskering where heavy metal sections surround thin cores. We have had a great deal of difficulty along those lines, and will appreciate further information on where iron oxide can be purchased, and how it is mixed with the sand.

A.—Iron oxide first came into prominence as an addition to core sands for steel molding where it was found to eliminate or reduce defects such as fissures or fins caused by the core cracking and permitting metal penetration. About 2 per cent is used, and while it appears to reduce the dry tensile strength of the cores about 40 per cent, its chief function is in extending the collapsibility of the core about 70 per cent. In other words disintegration of the core is delayed sufficiently so that a firm skin or shell is formed around the core.

Two explanations for the action of iron oxide in retarding core collapsibility are that it adds to the fines in the mixture which protect the binder, or that it forms a silicate glass with the sand under high temperature which acts as a binder holding the core together. Refractoriness of the sand is not decreased through addition of the amount of iron oxide mentioned. Iron oxide comes in the form of a powder, and is mixed with the sand like any other ingredient. It may be purchased from several firms whose names may be found in the advertising pages of THE FOUNDRY. Another material which has given excellent results in preventing metal penetration is zirconia flour which is used with water, clay, etc. to form a liquid which is sprayed on the cores. A coarser material, zirconia sand is mixed with clay, etc. to form a facing material.

GANGWAY! By J. A. Patterson

"I got sick and tired of you birds using this gas and tire rationing as an excuse for being late, so—"

Slag Inclusion Is Cause of Leaks

Q.—We are forwarding a small brass casting rather intricate in shape and extensively machined before it is tested. The machined surfaces apparently are clean and solid, but the casting leaks under pressure.

A.—Examination of the casting through a small magnifying glass reveals scattered patches of slag in the skin. If slag appears here and there in the skin, it is reasonable to assume that more of the same material is scattered throughout the body of the casting and therefore responsible for the leaks when the casting is tested. Proper care in skimming the metal before it is poured will eliminate the hazard. General appearance of the metal on the machined areas indicate that the melting, molding and coremaking technique are satisfactory.

Test Bars Fail To Meet Minimum

Q.—We are enclosing two specimens cut from test bars that failed to pull the minimum of 30,000 pounds per square inch. The alloy is 85-5-5-5 and made from an all ingot heat. Can you offer any suggestions as to the cause of the difference in color on the fracture?

A.—Without analyses of the two samples it is hard to differentiate between them or to explain just why you are having trouble in reaching the 30,000-pound minimum, except to theorize. The fractures do indicate the possibility that the metal was poured rather hot which might mean that considerable zinc was burned out during melting, and that the alloy is not true to formula when cast. It also might mean that some oxides were included in the metal and caused weakness at the grain boundaries. The colors indicate the possibility of a change in formula, and in fact it looks as though the lead were rather high which would mean lower ultimate and yield strength.

If you will compare the fractures with those of bars which pulled satisfactorily, and according to analyses were true to formula, you will learn quickly the differences between fractures of good and poor metal. First of all it will be necessary to have chemical determinations made on the bars. Then you should see that the test bars are fed properly, and poured at the proper temperature. All those are essential in obtaining concordant results. Made under the proper conditions the fracture of the bar will show a more or less satiny structure instead of the discolored crystalline structure in the samples submitted. However, when the metal is overheated and poured at an elevated temperature beyond the proper one, the structure tends toward the crystalline, particularly if the risers have cooled before they have a chance to feed the test bars properly. Consequently, you will find it advantageous to study fractures of bars poured at various known

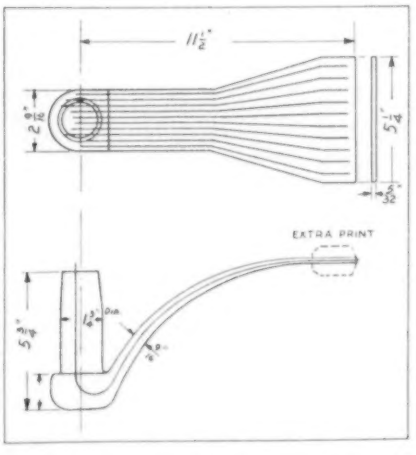
temperatures as well those of bars with slightly different compositions.

We also would like to point out that the analytical work should be performed by a competent and skilled individual familiar with procedure for nonferrous alloys. Since without accurate data on composition, you will not be able to correlate the other test information properly. Hence, you will run into situations which are not easy to secure satisfactory explanations if all investigations are not conducted as accurately as possible. Also, a large number of specimens should be examined before any conclusions are drawn.

Core Wires Stick In the Casting

Q.—We are enclosing a sketch of a core for small gray iron casting showing arrangement of core wires. We have trouble in removing these wires from the casting. The core is made up of 45 parts white beach sand, 1 part oil binder, with ten No. 18 wires arranged as shown and extending from end to end of the core.

A.—Unless the core is exposed to extraordinary pressure there is no need of placing so many wires in it. Three should be sufficient. One in the center with a toe turned up as shown at the left. The other two, about ½-inch from the edge, do not need this toe. A reinforcing print as shown at the right will provide the necessary strength.



Reinforcing print at right end would supply strength and eliminate most of the wires

Melting Pipe Iron In Air Furnace

Q.—We are thinking of making cast iron pipe by the centrifugal process in sand lined metal molds. We cannot use a cupola, because no coke is made in this country, and we cannot import any under present conditions. However, oil is plentiful and cheap. We shall appreciate your opinion on whether we can melt the iron satisfactorily in an oil fired air furnace.

A.—Iron melted in an air furnace fired with oil or powdered coal should prove as satisfactory as metal melted with coke in the cupola. For a fairly complete treatise on the subject you are referred to a paper presented by A. Van Lantschoot at the St. Louis convention of the American Foundrymen's Association, April, 1943. He described a furnace employed in melting malleable iron, but with slight modification the text might apply to gray iron. A brief synopsis of the paper follows:

The oil fired furnace is most efficiently operated with the least amount of air necessary for complete combustion. The top blast, or secondary air is considered necessary. Low air pressure, as well as a low stack are desirable. Only one burner of simple design is used and the oil is atomized by steam pressure. A flow meter is considered indispensable for uniform results. Uniformity of operation and the ability to produce the desired composition as soon as the metal has attained the proper pouring temperatures are outstanding advantages. Refractories are important and simple service records covering the life of the bungs are kept because in addition to valuable information given, they stimulate the melter's interest in decreasing refractory consumption. The effect of silicon and carbon on tensile properties is shown and the most desirable silicon-carbon ranges are indicated. Effect of low carbon on shrinks also is covered.

Annealing Pots Must Have Long Life

Q.—We would like to improve the life of annealing pots used for malleable castings and would appreciate information on mixtures to give the maximum pot life.

A.—Many malleable iron foundries make their own pots from the same type of white iron which is used for the regular castings production, and the life obtained apparently is satisfactory since they make them regularly a few at a time. While use of alloys presumably would give pots with longer life, cost and other factors must be considered before

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★ *Nickel* ★

THE INTERNATIONAL NICKEL COMPANY, INC., *67 Wall St., New York 5, N. Y.*

(*Concluded from page* 120)

a definite decision can be made. One difficulty is that too many casting consumers buy only on a price basis, and are unwilling to pay a slight premium for a high grade product. Consequently, it would be a good plan to discuss the problem of long-life pots with your customer, and see whether or not he is willing to pay the extra cost of value received. If not then it will be wise to make the regular white iron pot.

Since you operate only a cupola, you will not be able to attain as low a carbon content as with an air furnace even with high steel scrap additions to the charge. We believe that suitable annealing pots will be produced from compositions within the range: Total carbon 2.50 to 3.10 per cent; silicon 0.45 to 0.90 per cent; manganese 0.40 to 0.60 per cent, phosphorus low, and sulphur around 0.100 per cent. Without knowledge of the raw materials you have available, it is difficult to suggest a suitable mixture. However, as previously mentioned considerable steel scrap will have to be employed to hold the carbon as low as possible. With the information on final composition range, you should be able to determine what materials and the quantity of each to form the metal charge. Use plenty of coke to get your iron good and hot. White iron freezes at a higher temperature than gray iron so it must be handled rapidly.

Thick Ring Shrinks Under Feeders

Q.—We are making cast iron rings 14 inches inside diameter, 37 inches outside diameter and with a 4-inch face. We place two 5-inch diameter risers at diametrically opposite points on the cope side and churn them with rods until the metal solidifies. When the risers are broken off we find shrink holes at the junction between riser and casting. The cupola mixture contains 45 per cent No. 1 machinery scrap and 55 per cent No. 1 pig iron.

A.—The risers on this casting are too small and therefore, are a detriment instead of a help. Even though they are kept open for some time with a rod, they freeze before the casting solidifies. The metal in the casting continues to shrink and since the supply in the riser is cut off, a shrink hole is developed in the casting. To function properly the riser should be large enough to maintain the metal in a molten condition, as long as the metal in the casting. In the present instance this means a pair of risers at least 12 inches in diameter and 10 inches high. For convenience in removal the riser may be necked down to about 3 inches diameter.

Rod feeding is not necessary if the top of the riser is covered with blacking, charcoal, silocel, dry sand or other insulating material. However, if the casting is not machined, drilled, bored, etc., extensively, or if it is not subjected to x-ray examination or pressure test, it can be made quite satisfactorily without any risers. It is of uniform section throughout and therefore will shrink uniformly. The center will not be as dense as the outside, but otherwise the casting will meet every requirement. Method of gating is immaterial. The metal may enter through a basin and three 1-inch pop gates on the top, through a single sprue and four branch gates in the center, or through a deep, narrow single gate in one corner of the flask.

Metal Enters Sand On Fluted Roll

Q.—We are making fluted rolls and have a great deal of extra work on account of the metal soaking into the sand which forms the flutes. The mold is dried and the metal is poured at a temperature of 2100 degrees Fahr. We have tried pouring the metal through pencil gates at the top and also through an arrangement of pencil gates at the bottom fed from a long down sprue. The sand mixture contains 20 parts silica sand, 1 part bentonite and 1 part pitch core compound. Total height of gate 7 feet. The casting is poured around a steel shaft in the center.

A.—Since the metal is poured at a temperature of 2100 degrees Fahr. we are assuming it is bronze. With the total height of the gate given as 7 feet we also assume that the casting is poured in a vertical position and that, after the usual foundry manner, the total height means the distance from the floor to the top of the runner basin. Therefore, allowing 3 inches for a ribbed bottom plate, 10 inches for the drag containing the lower end of the shaft, and 12 inches for the cope and pouring basin, the total length of the casting is approximately 5 feet. Looking at the sketch in this light our guess is that the casting is between 8 and 10 inches in diameter, total weight between 1000 and 1300 pounds. While this comparatively heavy body of metal remains in a molten condition a heavy static pressure is exerted on the comparatively fragile sand flutes which form the face of the mold. Combination of heat and pressure forces some of the metal into the interstices between the sand grains, consequently extra precautions must be taken. To your present facing sand mixture add 1 part iron oxide and 2 parts coal dust and after the mold is dry, paint the flutes with silica wash or a good grade of plumbago. Gate the mold top and bottom. Pour about 6 inches through the bottom gate and then pour the remainder of the metal through the top pencil gates. Use of zirconia flour as a facing material will prevent penetration of the molten metal.

A Correction

It is regretted that an error appeared on page 132 of the November issue with reference to a Navy specification for brass castings, under the heading "High Zinc Content Causes Trouble." Proper designation should be Navy specification 46M4 on brass castings to be brazed. Federal specification QQ-B-601 is similar in context.

Wants To Use Cupola To Melt Bronze

Q.—We are located in western Canada and have been requested to cast bronze bushings somewhat larger than our crucible melting capacity, and would welcome suggestions. The bushings will take about 1500 pounds each, and as we have a cupola formerly used for melting iron thought we might be able to employ it for melting the bronze. However, we have had no experience along that line. The cupola is lined to 24 inches and the well will hold about 400 pounds of iron. Can you tell us whether the idea is practical; what windbox pressure to use; correct metal and fuel charges; should continuous or intermittent tapping be used; what zinc and other losses can be expected; best method of deoxidation, etc.?

A.—Cupola melting of nonferrous alloys, that is copper-base type, has been used over a long period of time, and the recent development is a small cupola of 22 inches inside diameter employing coal-tar pitch coke as the fuel. That type of coke is said to be low in sulphur. Petroleum coke as well as by-product coke and charcoal, and mixtures of by-product coke and charcoal have been used successfully for melting red metals in the cupola. Blast used in melting usually is low and in the neighborhood of 3 ounces. Blast is roughly about 150 cubic feet of air per pound of coke.

Since we are not familiar with your situation on fuels, we will have to assume that only foundry cupola coke is available, and we know that it has been used with satisfactory results. It is suggested that you place the bed so that when it is burned through it will be 27 inches above the tops of the tuyeres. While 500-pound charges of ingots can be melted, it may be advisable to use 250-pound charges with 15-pound coke splits. As mentioned previously, the blast pressure should be low, and the wind volume about the same as for gray iron. It may be advisable to add a small amount of fused soda ash to each charge, say 1 pound, to aid in reducing sulphur, and to provide a fluid slag. Roughly your 24-inch cupola should melt around 2 tons of bronze per hour, and we see no reason why the taphole cannot be left open after the metal begins to melt and a reasonable amount has been built up in the well.

Opinions vary on the loss of metal in cupola melting, and claims as high as 98.5 per cent recovery in the case of ingot metal have been made. The loss principally zinc, but you should make analyses of the final metal to determine what the exact losses are in various elements so that proper corrections can be made. Deoxidation in cupola melted bronze is the same as with crucible or other furnace melting—use of small amounts of phosphor-copper, say about 1 ounce per 100 pounds.

Not a great deal has been presented in literature on cupola melting of bronze. The September, 1938 issue of THE FOUNDRY has an article entitled, "Melts Bronze in a Small Cupola", by John Duffy.

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EASTMAN KODAK CO.
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MEN ...of Industry

JOSEPH B. TERBELL has been appointed first vice president of the American Manganese Steel Division of the American Brake Shoe Co. Born in 1906 and graduated from the Sheffield Scientific School of Yale University in 1928, Mr. Terbell joined the American Manganese Steel Division in the latter year at the Chicago Heights, Ill., plant. Since 1930 he has been engaged in sales work for the company, except for two brief periods when he was transferred to other divisions of American Brake Shoe Co. In 1937 Mr. Terbell was made eastern sales manager at New York for American Manganese Steel and in 1940 he was named a vice president of the division.

♦ ♦ ♦

Paul Mayfield, director of sales of the naval stores department of Hercules Powder Co., Wilmington, Del., has been appointed assistant general manager. Mr. Mayfield, who joined Hercules in 1926 as a chemist, has served as naval stores sales director since 1939.

♦ ♦ ♦

Fred L. Wolf, recently deputy director of the Mica-Graphite Division, Minerals Bureau, War Production Board, Washington, has been appointed executive vice president of the Ross-Tacony Crucible Co., Tacony, Philadelphia. Prior to his connection with WPB he was associated for many years with the Ohio Brass Co., Mansfield, O., as technical director in charge of laboratories, research and plant control work. In 1941 Mr. Wolf was awarded the John A. Penton Gold Medal of the American Foundrymen's Association for his outstanding contribution to the nonferrous and malleable iron industries.

♦ ♦ ♦

William R. Moore has been made a vice president of Norton Co., Worcester, Mass., in charge of national accounts, handling ore and grain sales to grinding wheel and abrasive paper and cloth manufacturers. He will also be in charge of sales of refractories, boron carbide and pulpstones. Mr. Moore joined the Norton Co. following his graduation from Pennsylvania State College. Associated with the sales engineering department, he was successively assistant sales manager of the abrasive division, director of market research, sales manager and in 1939 he became general sales manager of that division.

♦ ♦ ♦

A. C. Erlandson, formerly with General Malleable Corp., Waukesha, Wis., has joined Pettibone Muliken Corp., Chicago, as general foreman of foundries. **F. W. Hintze,** previously with Illinois Clay Products Co., is now sand and refractory engineer for Pettibone Mulliken. Other new associations with the company include **R. E. Kerr** as metallurgist and **C. W. Nooker** as foundry engineer. Mr. Kerr formerly was assistant metallurgist, research division, Ohio Steel Foundry Co., Lima, O. Mr. Nooker had been connected with Mississippi Valley Power & Light Co. of Minnesota and for the past year was with Continental Roll & Steel Foundry Co.

♦ ♦ ♦

H. L. Edinger has been elected president, Barnett Foundry & Machine Co., Irvington, N. J. He began his business career with the company 35 years ago and prior to his latest appointment had been vice president, a position in which he will be succeeded by **G. W. Hannay,** formerly secretary. **Gerald Hannay,** who, since the death of Thomas Hannah, president, in 1935, had occupied the positions of both president and treasurer, will continue as treasurer, and **G. Baer,** formerly assistant secretary, has been appointed secretary. Mr. Baer is also comptroller.

♦ ♦ ♦

H. H. Henry, safety director, Otis Division, Jones & Laughlin Steel Corp., Cleveland, was elected chairman of the Foundry Committee of the Metals Section, National Safety Council, at the recent National Safety Congress in Chicago. Other members named to the committee include **L. S. Adams,** per-

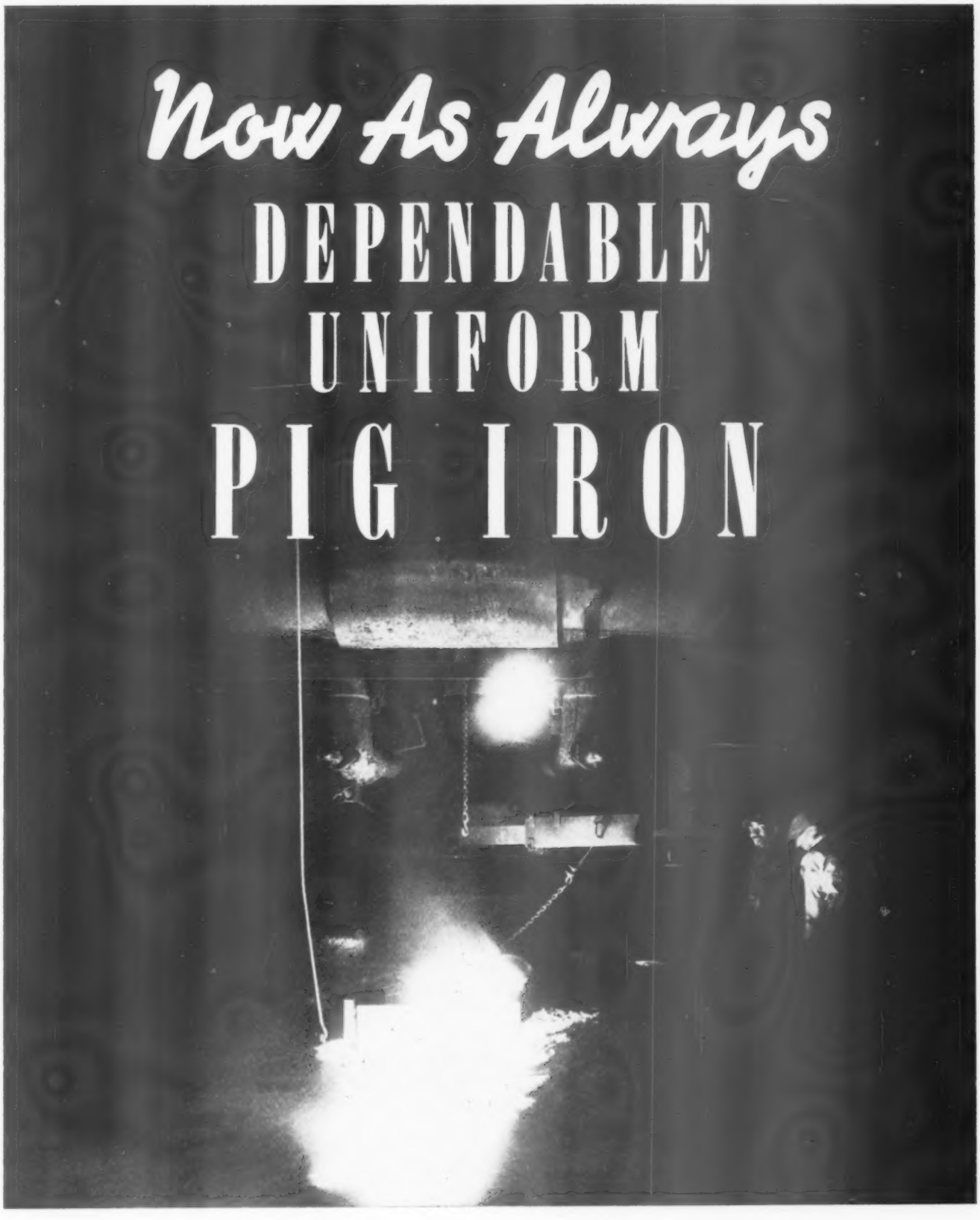
(*Continued on page* 126)

PAUL MAYFIELD

WILLIAM R. MOORE

FRED L. WOLF

JOSEPH B. TERBELL



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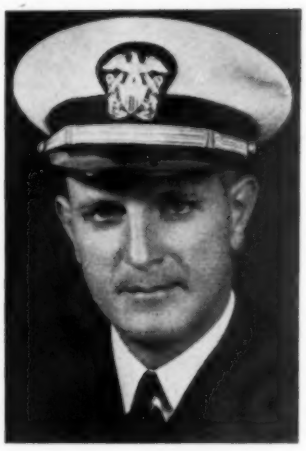
GRANT S. DIAMOND

Who has been named president, Electro Refractories & Alloys Corp., Buffalo, as reported in THE FOUNDRY for November. Previously he had been executive vice president of the company.



LIEUT. COMM. LESTER B. KNIGHT

Who has resigned as vice president and sales manager, National Engineering Co., Chicago, to supervise naval foundry facilities for the Bureau of Ships, Washington, as reported in THE FOUNDRY for October.

WALLY E. GEORGE

Who recently resigned as assistant to the management, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., to join Booz, Allen & Hamilton, Chicago, as reported in THE FOUNDRY for November.

(*Continued from page* 124)

sonnel supervisor, Continental Roll & Steel Foundry Co., East Chicago, Ind.; **L. J. Armstrong,** safety director, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., and **J. R. Cox,** safety engineer, Fairbanks, Morse & Co., Beloit, Wis.

♦ ♦ ♦

Dr. Zay Jeffries, technical director of General Electric Co.'s lamp department, Nela Park, Cleveland, was made the first recipient of the Gold Medal of the American Society for Metals at the recent National Metals Congress in Chicago. The medal was awarded Dr. Jeffries "in recognition of his outstanding metallurgical knowledge and his great versatility in the application of science to the metal industry."

♦ ♦ ♦

Reuel E. Warriner has resumed duties with the International Nickel Co. Inc. at New York, having completed his assignment with the Tank Automotive Center of the Army Ordnance Department. Mr. Warriner is now supervising the movement of nickel required to meet the demands of the steel industry.

♦ ♦ ♦

Edward J. Burnell, recently vice president and general manager in charge of Pershing Road plant operations and central division sales for Link-Belt Co., Chicago, has been transferred to the executive office as vice president in charge of sales for the entire company. Assisting Mr. Burnell in his new post will be **Nelson L. Davis,** sales manager for material handling machinery; **William H. Kinkead,** sales manager for power transmission machinery; and **C. Walter Spalding,** sales manager for power transmission equipment required for original equipment manufacturers and duplicate machinery accounts.

Harold L. Hoefman, manager of the Link-Belt Co.'s Atlanta plant, succeeds Mr. Burnell as general manager at the Pershing Road plant in Chicago. **Richard B. Holmes,** district manager at Indianapolis, has been appointed manager of the Atlanta plant to succeed Mr. Hoefman, and **David E. Davidson,** district engineer at the company's Detroit office, succeeds Mr. Holmes as Indianapolis district manager.

♦ ♦ ♦

Dr. M. A. Grossmann, who was elected president of the American Society for Metals during the recent National Metal Congress in Chicago, has been director of research for Carnegie-Illinois Steel Corp. since 1935. Born in Youngstown, O., in 1890, he was graduated from Massachusetts Institute of Technology in 1911. His industrial connections since that time have included Pittsburgh Testing Laboratories, Vanadium Corp. of America, Electric Alloy Steel Co. and Atlas Steel Corp. From 1924 to 1931 he was associated with Republic Steel Corp. and predecessor companies. In 1931 Dr. Grossmann joined the former Illinois Steel Co., now part of Carnegie-Illinois Steel Corp.

♦ ♦ ♦

Frederick Walker, recently assistant general manager, Federated Metals Division, American Smelting & Refining Co.,

(*Concluded on page* 128)

DR. ZAY JEFFRIES

REUEL E. WARRINER

EDWARD J. BURNELL

DR. M. A. GROSSMANN

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(*Concluded from page* 126)

New York, has been named Pacific coast general manager, succeeding Jack Schwartz, resigned. **Aubrey M. Collis,** formerly Federated Metals manager at Portland, Oreg., returns to the Pacific coast as assistant general manager. For the past two years he has been operating manager of the company's Pittsburgh plant.

♦ ♦ ♦

Joseph D. O'Flaherty has been appointed assistant manager in charge of sales and promotion for the United States Electrical Tool Co., Cincinnati. He was formerly branch manager of the Schacht Motor Co., Columbus, O., and for 13 years was sales manager of the Dimond-T Truck Co. of Cincinnati. **Al H. Kohnen** has been placed in charge of United States Electrical's Pittsburgh office from which he will cover eastern points.

♦ ♦ ♦

Daniel C. Teetor has been elected second vice president of the Perfect Circle Co., Hagerstown, Ind. He formerly was general factory manager. **William B. Prosser,** former manager of the company's Tipton and Richmond, Ind., plants, has been named general factory manager and has been succeeded at Richmond by **William Cramer.**

♦ ♦ ♦

R. H. Rodolf has been appointed manager of the pump and compressor division of Gardner-Denver Co., Quincy, Ill., following the death of R. J. MacFarland. He has been associated with the company or its affiliates since 1917, previously having served as St. Louis district manager and more recently as assistant manager of the portable compressor and rock drill division. **C. M. George,** recently connected with the general sales department, has been named Mr. Rodolf's assistant. He joined the company in 1929.

♦ ♦ ♦

John C. Redmond has been appointed research engineer and chief analytical chemist for Kennametal Inc., Latrobe, Pa. Recently he was associated with the Youngstown Sheet & Tube Co. in chemical analysis, research and process development work.

♦ ♦ ♦

W. E. Addicks, previously in charge of the Boston sales office of Cutler-Hammer Inc., has been named manager of the New York district office. He has been succeeded at Boston by **C. V. Topliffe** who recently has been associated with that office in a sales capacity.

♦ ♦ ♦

William H. Eisenman, secretary, American Society for Metals, Cleveland, has been made a founder member of the society in recognition of his 25 years of service with the organization. This honor, held by only four men previously, was conferred upon Mr. Eisenman at the society's annual dinner in Chicago, Oct. 21, during the twenty-fifth National Metal Congress.

♦ ♦ ♦

A. H. Feibel, president, Kelley-Koett Mfg. Co., Covington, Ky., was elected chairman of the X-Ray Section of the National Electrical Manufacturers Association at the latter's recent annual meeting in New York. Mr. Feibel is also a member of the X-Ray Industry Advisory Committee of the War Production Board.

A. H. FEIBEL

♦ ♦ ♦

M. D. Johnson, chief inspector, Caterpillar Tractor Co., Peoria, Ill., has been appointed chairman of the Committee on Inspection of Castings recently established by the American Foundrymen's Association (THE FOUNDRY, November, p. 146). A graduate of Syracuse University, Mr. Johnson formerly was associated with the Brown-Lipe Gear Co., Syracuse. He joined Caterpillar Tractor Co. in 1929 as assistant chief inspector and shortly after was made chief inspector for the entire factory.

M. D. JOHNSON

L. A. Orrill has been appointed general manager of production for the Pittsburgh Cast Products Corp., Swissvale, Pa. Long experienced in metallurgical and foundry practice, Mr. Orrill formerly was associated with the Federated Metals Division of American Smelting & Refining Co.

♦ ♦ ♦

Vaughan C. Reid, in charge of the metallurgical department of City Pattern Foundry & Machine Co., Detroit, and son of the president of that company, has been elected a vice president.

♦ ♦ ♦

Dr. Nathaniel Baum has been appointed head of a new organic research laboratory opened by Turco Products Inc., Los Angeles, manufacturer of specialized industrial chemical compounds.

♦ ♦ ♦

Wallace K. Brown, formerly vice president in charge of procurements for the Crocker-Wheeler Electric Mfg. Co., Ampere, N. J., has been made manager of the New York district sales of the Crocker-Wheeler Division of the Joshua Hendy Iron Works office in the latter city.

♦ ♦ ♦

W. E. Worth, director of purchasing, traffic and fiber, International Harvester Co., Chicago, has been elected vice president in charge of supply and inventory. In addition to his new responsibilities, Mr. Worth will retain his present title and duties.

♦ ♦ ♦

K. C. Gardner, recently executive vice president and general manager, United Engineering & Foundry Co., Pittsburgh, has been elected president and general manager, succeeding the late George T. Ladd.

♦ ♦ ♦

John F. Regis Reynolds, formerly first helper at Jones & Laughlin Steel Corp., Pittsburgh, has been appointed melting foreman at Symington-Gould Corp., Rochester, N. Y.

♦ ♦ ♦

Morris Isaacson, for the past several years sales manager, R. Lavin & Sons Inc., Chicago, has been elected vice president.

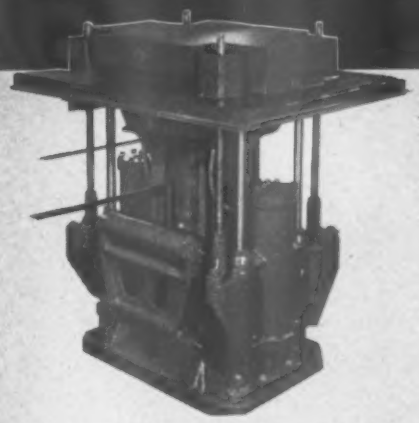
♦ ♦ ♦

Dr. Paul D. V. Manning, since 1941 director of research, International Minerals & Chemical Corp., Chicago, has been elected a vice president.

♦ ♦ ♦

R. J. Russell, vice president and sales manager of the Century Electric Co., St. Louis, has been elected president of the Associated Industries of Missouri.

- AND NOW FOR THOSE *Unusual* JOBS!



SPO No. 300 Series, Jolt Stripper Machines. Adjustable stripping pins accommodate wide variety of flask shapes and sizes.

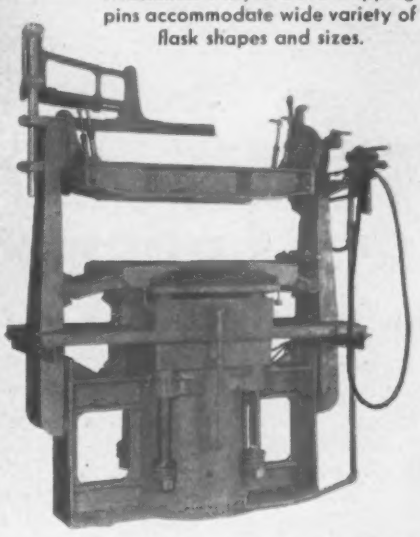
Last month we presented a group of SPO Molding Machines which, we felt, would answer for perhaps 90% of your foundry jobs. Here are several which fill many UNUSUAL requirements

★ "But this job is different!" did you say? Very well . . . The four machines shown here have taken care of so many "different" requirements that they have earned a permanent place for themselves in the SPO line. They handle a great many unusual jobs, which are in turn typical of a great many more. For example:

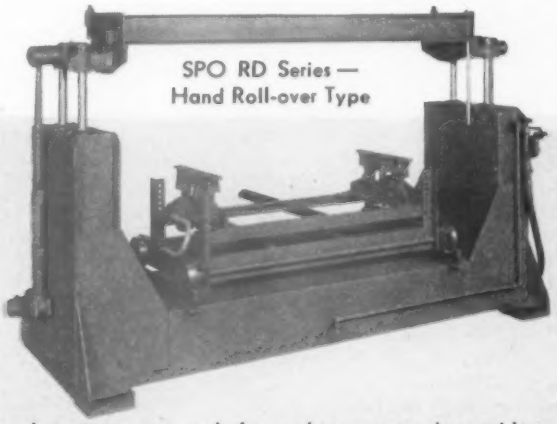
SPO No. 312 Jolt Stripper has long 24" draw extremely accurate all the way; powerful jolt packs deep molds hard — a necessity in steel foundries.

SPO No. 920 Jolt Roll-over Squeeze Draw Machines for the fast production of drag half molds. Roller conveyor carries finished half mold away.

SPO RD Series machines are custom-built to the job. Let this page stand for SPO'S willingness to cooperate with you in designing *special* equipment which will satisfy your needs *exactly*. A wide experience as practical foundrymen is yours to command.



SPO No. 900 Series, Jolt Roll-over Squeeze Pattern Draw Machines. Well known for trouble-free service and long life.



SPO RD Series — Hand Roll-over Type

SPO RD Series — Power Roll-over Type

The SPO RD Series excels where large, heavy cores are made for crankcases, supercharger blowers, etc.— wherever a roll-over operation and deep, accurate draw are required. Illustrations show mold or core run-out car in back (left) and forward (right) positions. Can also be used in connection with sand-slingers. Operating mechanism fully enclosed in machine ends.

SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

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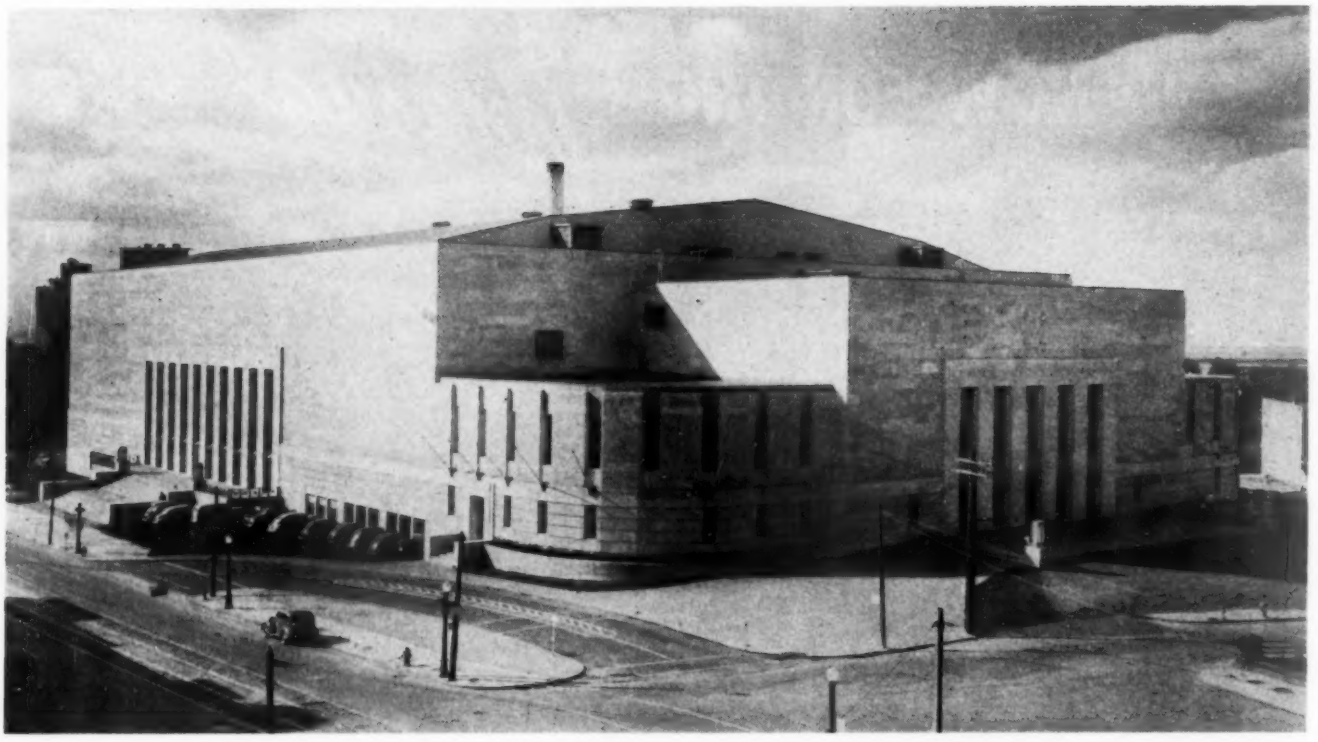

Buffalo Memorial Auditorium, where Third War Production Foundry Congress and exhibit will be held next April 25-28

A.F.A. Plans 1944 Foundry Congress

To Serve Industry's Wartime Needs

WITH castings recognized as the "No. 1 Critical Material" of war production, the foundry industry will meet in Buffalo next April 25-28, seeking answers to their most pressing problems of control, production and quality at the Third War Production Foundry Congress. The Congress and 48th annual meeting of the American Foundrymen's Association, sponsoring the event, will be held in conjunction with an exhibit of materials, equipment and supplies for foundry use, and is being planned with a definite wartime purpose.

Both the Congress and the Foundry Show, it has been announced, will be held in Buffalo's new Memorial Auditorium. Facilities for both exhibits and meeting rooms are excellent, and with the auditorium situated in the downtown district, the time of visitors will be greatly conserved.

Announcement has been made that the Foundry Show will be a concentrated affair, with the emphasis on products and services having definite wartime value to the industry. The unlimited type of event held in some previous years will be missing in 1944, but will be more than made up for by presentation of many new developments and product applications that have grown out of America's war production experience.

Effort is being made to stage what has been termed a "stripped-for-action" Foundry Show. Standard booth equipment will be provided all exhibitors, it having been decided to restrict the use of the elaborate "built booth" type of display. Such displays, it is felt, require transportation and storage space unwarranted for a wartime exhibit. Preliminary interest by manufacturers and suppliers indicates that the 1944 Foundry Show will be representative and complete in every way.

That the technical features of the Congress will be of wide and timely interest is confirmed by the reports from some 20 committees of the association, each of which is arranging for discussion sessions where papers and committee reports will be presented. All reports indicate that developments and practices applying to current problems in the production of castings for war use will be thoroughly covered.

A number of sessions of the round-table or panel variety are being provided for "off the record" discussions of special war production problems. General interest and A. F. A. division committees also are developing programs applying to each of the branches of cast metals.

Several symposia have been arranged, the Malleable division specializing in heading and gating, and the Steel division planning to cover shop practices, melting practices, heat treatment and sand control. A third symposium of greatest current interest will be that dealing with centrifugal casting developments.

The annual Foundation Lecture of A.F.A., initiated in 1943, will be presented by H. W. Gillett, chief technical advisor of Battelle Memorial Institute, Columbus, Ohio. Dr. Gillett, an A. F. A. medalist and internationally recognized authority on metallurgy, has chosen "Cupola Raw Materials" as his subject.

A feature of the Gray Iron division program will be reports and papers of the Committee on Cupola Research, now engaged in preparing an extensive and important handbook of cupola operation.

The Brass and Bronze division will stress manganese bronze castings work due to the increasing use of alloy castings in meeting wartime demands.

Several sessions of the Aluminum and Magnesium division will be of outstanding interest, as developments in these branches have been greatly accelerated during the past 2 years, and many foundries getting into this work are eager for any information obtainable.

An additional subject of interest to practically every foundry, on which no set program has as yet been announced, undoubtedly will deal with postwar problems of the foundry industry. In the light of discussions held on this subject by organizations in recent months, it may be that this subject will prove one of the most interesting and informative of the Congress.

RAMS FASTER . . . Truline starts time-saving right at the start! Easy to handle and mix . . . it develops a core-sand that rams quickly and works well in the core box.

BAKES FASTER . . In the bake oven, Truline forms a strong bond at relatively low temperatures, develops its bond faster than binders which require oxidation, thus cutting baking time.

CLEANS FASTER . . . In addition, Truline Binder starts to lose its bond as soon as the heat strikes, causing the core to collapse quickly. Core-removal is fast, which helps to save valuable cleaning-room time.

SAVES TIME all the time!

TODAY time is vital with every foundryman, yet, time is usually the material he has the least of!

Truline saves time *all the time!* And that isn't all! Because Truline-bonded cores collapse quickly—as the metal cools and shrinks—castings are free to shrink fully, thus eliminating the danger of hot-tears. Castings are true to core-box dimensions and this, too, helps eliminate the cause of many rejects.

For further information, or a sample, fill in the coupon. No obligation.

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JJ-64

Among DETROIT Foundries

BY A. H. ALLEN
Detroit Editor,
The Foundry

PEERING into the not too distant future of the art of casting metals commercially, one of the most significant trends is in the direction of "investment" casting of a wide variety of materials, ranging from aluminum, brass and bronze all the way to carbon and alloy steels and high-temperature alloys for special purposes.

Investment casting is nothing new to the jewelry trade or to the dental trade, for it has been practiced in a variety of forms for a good many years. One well-known process is the lost wax method whereby a wax impression of the part to be cast is made, then the refractory or ceramic mold material is shaken around the wax (similar to vibrating a mold), the wax melted out, the mold baked and the metal poured into the mold while it is spun.

Since the mold material is in powder form it penetrates all parts of the wax impression, and cores become integral parts of the mold. Further, the fineness of the material results in a smooth finish on the casting, comparable to the best machined, ground and polished surface, and made to precision tolerances dimensionally.

There are perhaps a score of investment processes for precision castings in small sizes; the important thing at the moment is that the method is in the stage of being transferred to industrial uses where volume production of larger parts is involved. Several companies in the Detroit area are interested, and real progress is expected to be registered within the next few months.

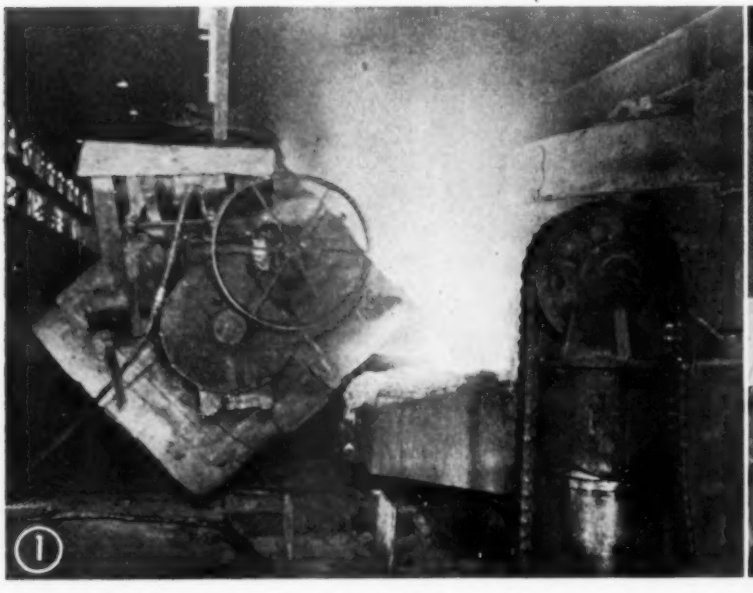
Dentists and jewelers, of course, are not foundrymen in the strict sense of the word, and few practical foundrymen have much knowledge of the casting techniques used by artisans in the dental and jewelry trade. But in the industrial application of investment casting a closer liaison between the two arts is under way, particularly in the latter respect.

One of the leading interests in the field of developing investment casting methods, as well as perfecting suitable alloys for dental and surgical applications, is the Austenal Laboratories Inc., New York, which has now licensed a number of companies to use its methods and materials, some of them in connection with the war production effort. For a number of years, Austenal has supplied such things as dentures, bridgework, bone caps, tubes and plates for surgical uses—all of an alloy known as Vitallium, which is inert and noncorrosive in contact with body fluids.

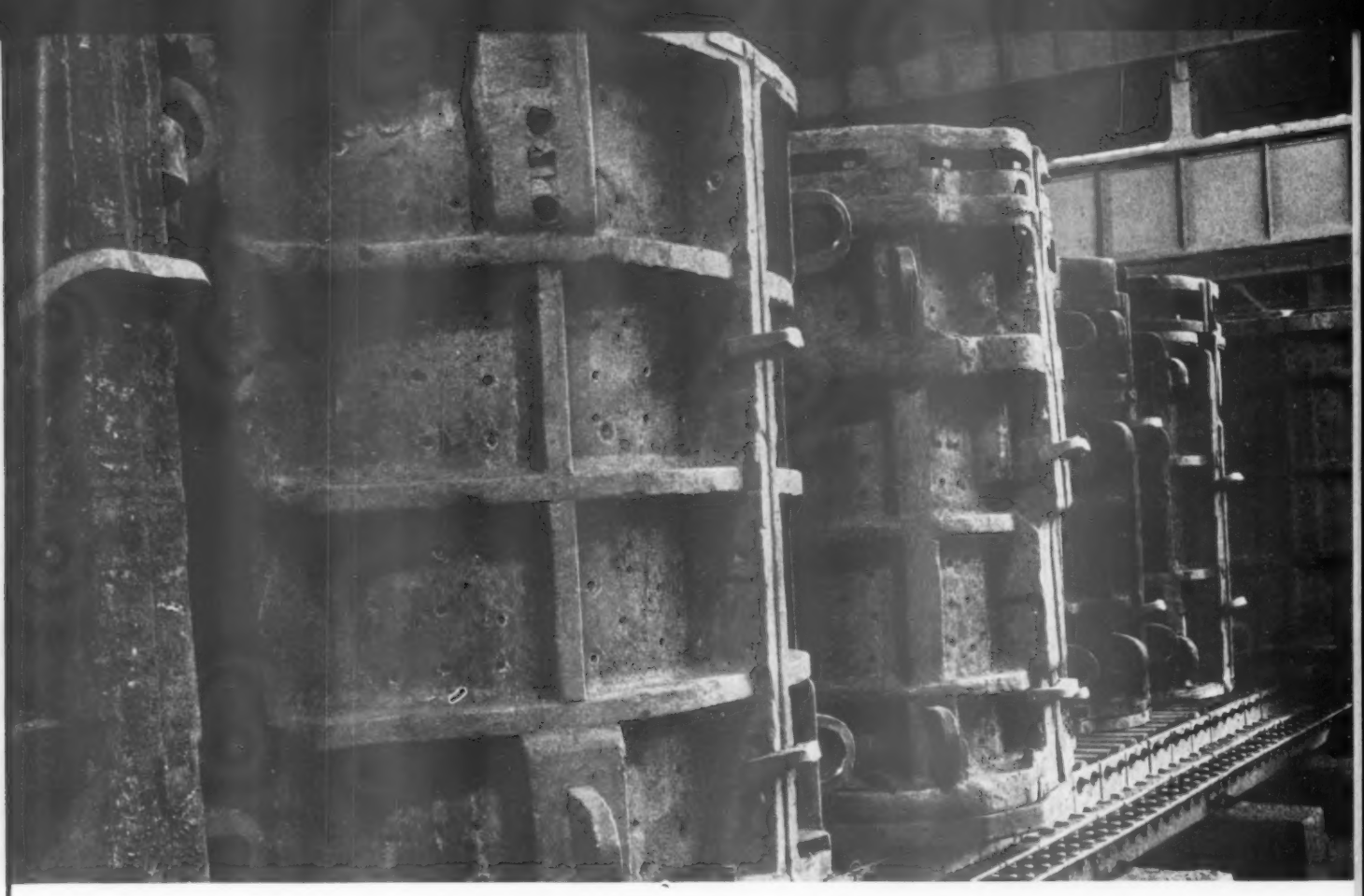
Vitallium is a Stellite-type material without the tungsten, containing 65 per cent cobalt, 30 per cent chromium and

(*Concluded on page* 134)

Produces Malleable Iron Castings in New Steel Foundry



Recent views taken in the new steel foundry of Ford Motor Co., Dearborn, Mich., where a portion of the facilities has been transferred to production of malleable iron castings (THE FOUNDRY, *November, p.* 144). *Fig.* 1 *shows an electric furnace being charged with hot metal from bessemer converters where it has been blown down after transfer from cupolas. This is the Ford triplexing process. Fig.* 2 *shows a cupola charging bucket resting on the wishbone at the top of the cupola, the bucket being hoisted to position from ground level by overhead traveling crane.* (*Other views on page* 134)



SPEEDING AMERICA'S PRODUCTION

The success of the Allied war effort depends greatly upon the speed of our production — the output of coils and sheets, castings and forgings, bars and shapes — and thousands of other vital materials. American Industry has already come through in a way that spells disaster for the Axis nations, and it's only the beginning.

Mathews Engineers are spending long hours in solving the many conveying problems which go along with this great production program. You can get Mathews engineering service and Mathews Conveyers with much less delay than you might think. By furnishing the highest preference rating you can possibly obtain, along with complete information regarding your problem, much time can be saved in obtaining the conveying equipment you require. Our job is to serve you in the most efficient manner possible.

MATHEWS CONVEYER CO.

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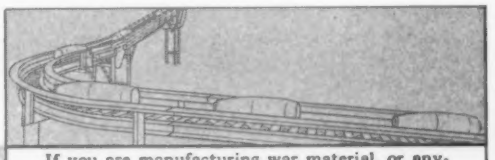


If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer

MATHEWS CONVEYERS FOR MECHANIZED PRODUCTION

(*Concluded from page* 132)

5 per cent molybdenum. It has high tensile strength, hardness and corrosion resistance, the latter at both normal and elevated temperatures. However, it cannot be machined at all readily, and hence is cast to shape by an investment process. A recently issued catalog shows a wide variety of surgical parts, including nails, screws, nuts, bolts, etc., all of cast Vitallium.

There are many phases of the current applications of that material which cannot be discussed. However, one of the most obvious uses is for buckets or blades in turbo-superchargers and gas turbines, where superior strength and resistance to heat corrosion are essential. It is understood that the Army Air Forces has standardized on the material for cast buckets of turbo-superchargers.

It is not only in the precision casting of such Buck Rogers' alloys that the investment process holds promise, since with some engineering study it looks to be suitable for such prosaic things as plain carbon steel. Obviously if castings can be produced with a finish comparable to a ground surface and dimensionally accurate to the thousandth of an inch, then the foundry industry really has hold of something. This is of course no news to those who are now probing into investment casting methods. One difficulty at the moment is the confused patent situation which means little as far as the war effort is concerned but might have important implications after the war.

Refractory materials for use in investments are of such mixtures as silica flour, bentonite and alcohol, which when compacted around the pattern would naturally result in a mold of low permeability and a casting of high finish. Proper venting is naturally an essential, but the further possibility has been suggested of combining centrifugal casting with casting in a full or partial vacuum. This might be productive of an even better casting.

While on the subject of foundry techniques aborning, another recent development has intriguing possibilities. That is the casting of one metal over, around or onto a dissimilar metal and obtaining a solid bond between the two. A specific application is the casting of an aluminum muff around a steel aircraft engine cylinder barrel, to supplant the present practice of press fits between the muff and the barrel. Secret of the successful bond appears to be the perfection of means to prevent formation of any oxide layer between the two metals as the one is cast over the other. Provision of an inert atmosphere around the casting, or the use of a suitable flux generating a neutral or reducing atmosphere are two ways of accomplishing this.

Increase Malleable Production

As pointed out here last month, the vastly expanded military truck program for 1944 has thrown intense pressure on sources for malleable iron castings. One of the first results has been announcement by the Saginaw Malleable Iron Division of General Motors that it will operate a new $2,200,000 malleable iron foundry plant at Danville, Ill., as soon as the building and equipment can be completed. The plant actually will be on a 54-acre tract of land at Tilton, Ill., just outside Danville, and will provide 130,000 square feet of floor space, employing approximately 500. Electric furnace melting will be practiced.

Output will be confined to Armasteel (pearlitic malleable iron) castings for use in axles of heavy-duty trucks. No machining will be done at Danville which, incidentally, is the forty-seventh city of the U. S. to accommodate General Motors operations.

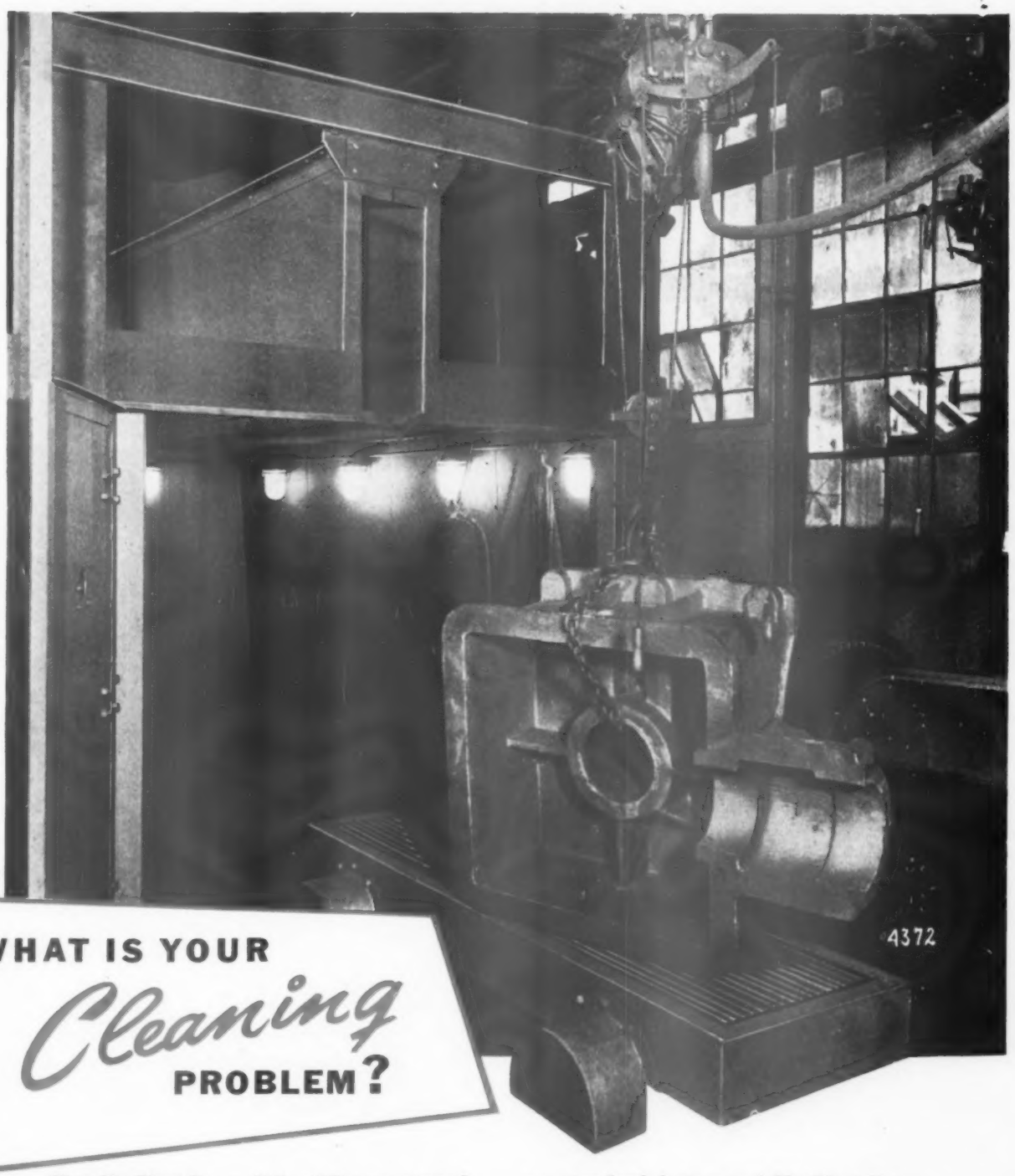
French E. Bassett, production manager at Saginaw and formerly sales manager and defense co-ordinator, will have charge of production at Danville, and left for that post early in November, accompanied by several key men including Harold W. Richter, stores superintendent, who will be purchasing agent; Clarence A. Mauch, foundry superintendent, who will be plant superintendent; Donald F. Richter and John D. Malone, engineers.

Speaking of malleable iron, an engineer with one of the leading steel suppliers here has conceived the idea of adapting a graphitized or malleableized iron to dies for plastic molding and other process where such dies are hobbed. The relatively soft malleable can be hobbed readily and then heat treated to file hardness before being placed in production. Considerable saving is expected over conventional types of tool steel used for this purpose, although the development is still in its preliminary stages.

Changes in the critical positions of materials have forced a prominent radiator manufacturer to switch, successively, from brass, to malleable iron, to gray iron, for inlet and outlet fittings on automotive-type radiators. While the brass and malleable could be tinned easily for subsequent soldering, this was not so easy in the case of gray iron with its exposed graphite. Solution was the use of an alkali cleaner of the molten salt type which scours the surfaces of the castings and dissolves the exposed graphite, actually creating small voids in the surface which provide good anchorage for the subsequent soft metal coating.

Penton Publishing Co., Cleveland, publisher of THE FOUNDRY, *Steel*, and *Machine Design*, has moved its Detroit office from 1010 Stephenson building to 502 Stephenson building, 6560 Cass Avenue.

(*Concluded from page* 132). *Fig.* 3 *shows load of malleable castings being removed from the Ford malleablizing furnace, this furnace equipment formerly being used in heat treating armor plate steel castings. Note charge of hot coke in center of loading platform, used to maintain proper atmosphere control in furnace during malleablizing. Fig.* 4 *shows part of the battery of electric melting furnaces, this view being taken from the charging side. On the opposite side are mold lines on which castings are poured, following the conventional Ford technique of bringing the molds to the metal*



WHAT IS YOUR *Cleaning* PROBLEM?

This Sly Blast Room (10′ x 16′) is equipped with Monorail and car track to facilitate handling large castings.

Note the excellent lighting. The walls and doors have an *extra layer* of steel. The ceiling is of *triple construction* to assure complete and uniform ventilation. These are standard features of Sly Blast Rooms. What is *your* cleaning problem? There is a SLY ENGINEER in your vicinity, available for consultation.

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TUMBLING MILLS ★ BLAST CLEANING EQUIPMENT

EQUIPMENT BUILDERS

Discuss Wartime Problems

THE twenty-fifth annual meeting of the Foundry Equipment Manufacturers Association Inc., was held at the Homestead, Hot Springs, Va., Oct. 22 and 23. A large group of foundry equipment manufacturers participated in an exceptional program dealing with problems facing their industry.

The program was opened by Ralph W. Hisey, vice president in charge of the machine division, Osborn Mfg. Co., Cleveland, and president of the association. Mr. Hisey outlined the progress which has been made by the organization during the past 25 years, and discussed some of the immediate problems arising from war production. He paid tribute to the Foundry Equipment and Supplies Section of the War Production Board for excellent co-operation with the industry.

Thomas Kaveny Jr., chief, Foundry Equipment and Supplies Section, Tools Division, WPB, Washington, then outlined some of the problems connected with the functioning of the section. He requested that applications for materials be submitted in sufficient time, and spoke of the good results that have been accomplished through the operation of CMP. He indicated that the general trend in demand for equipment is down, but that substantial expansion is taking place in facilities for producing malleable castings. Mr. Kaveny announced his resignation as chief of the Foundry Equipment and Supplies Section and stated that he would be succeeded by Bradley Stoughton who has been connected with the Tools Division in charge of the heat treating equipment section since the OPM, predecessor to the WPB, was organized. Mr. Kaveny will continue with the section as consultant.

Prepare for Postwar

John F. Fennelly, executive director, Committee for Economic Development, Washington, presented an interesting discussion on "Preparation For The Postwar Period." Mr. Fennelly took issue with those who refer to full unemployment after the war, and stated that the thinking and conversation should be along the lines of a high level of employment. He pointed out that while industry can not depend upon an early victory, it must not depend upon a long war in planning for the postwar period. In his opinion it will be possible to shut-off 80 per cent of munition production when the war in Europe ends, and still fight Japan. The major shock to the economy of this country will come when the European war closes.

Mr. Fennelly stated that in his opinion reconversion will not be sufficient. In order to provide a high level of employment, it will be necessary to reconvert, and to provide rapid expansion. The tremendous accumulation of wartime savings is one of the hopes which will permit the accomplishment of rapid expansion. Unless goods are forthcoming to meet the great demand following the close of the war, it is probable that this country will have the dissipation of these savings and uncontrolled inflation.

The Committee for Economic Development is working through local organizations in planning for the postwar period. Over 900 local committees already have been organized in all parts of the country for the study of particular problems. By working through such committees and discontinuing the insistence upon action from Washington, much may be accomplished.

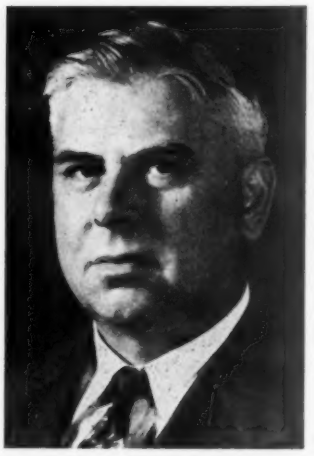
At the close of this session the following were elected as directors of the association: H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland; O. A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind., and B. L. Simpson, National Engineering Co., Chicago.

Describes Convention Plans

The 1944 convention and exhibition of the American Foundrymen's Association was discussed by William M. Maloney of the A.F.A. who was substituting for C. E. Hoyt who was prevented from being present. Mr. Maloney described AFA's plans for the convention to be held in Buffalo during the latter part of April. He advised that plans were underway for an exhibit greatly reduced in size from the type of "full" exhibits which have been held in the past. Exhibitors are requested to use standard booth equipment at the Buffalo auditorium. Operating exhibits of the type generally considered in order over the past will not be used. It was stressed, however, that operation of certain equipment which is more or less of the demonstrating model type and which can be accomplished easily will be sanctioned.

Arthur J. Tuscany, presented the treasurer's report which showed the association in a healthy financial condition with excellent progress during the last 12 months in building a reserve against future contingencies.

The membership committee report, made by Otto A. Pfaff, vice president of the association and chairman of the membership committee, indicated an addition of 12 new members during the fiscal year. Mr. Pfaff advised that the board of directors has been putting forth considerable effort to increase the membership which was proving to be successful. As a matter of fact, most of the increases have come through that source. He urged all members to participate in this effort, pointing out that it was to the advantage of every company to do so for the reason that the larger the membership, the more effective the work of the association in all matters dealing with industry representation.



RALPH W. HISEY

OTTO A. PFAFF

ARTHUR J. TUSCANY

The statistical committee work was reported on by Bruce L. Simpson, vice chairman of the committee. Mr. Simpson described in detail various ways through which companies are finding the statistical interchange helpful in the day-to-day conduct of their business. He gave several examples showing how his company has

(*Continued on page* 156)

Information supplied by an Industrial Publication

Not only the quality of steel castings, but their practicability and production cost under ordinary foundry conditions are influenced by design. The following suggestions are offered as an aid to proper design.

1. Whenever possible, all sections should be designed for uniform thickness.

2. Structural design involving abrupt changes in section should be avoided.

3. Sharp corners at adjoining sections should be eliminated whenever possible.

4. When the structure becomes very complicated, it is better to break it into several components that can be cast separately and assembled by welding or bolting.

5. In designing unfed sections in "L" or "V" shapes, it is suggested that all sharp corners at the junction be replaced by radii so that this section becomes slightly smaller than that of the arms.

6. In designing sections that join to make an "X", it is suggested that two of the arms be offset considerably.

7. In the case of unfed "T" and "X" sections, the radii at the junctions should be relatively small.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

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4 Firsts AND SEVERAL "VERY HIGHS"

for BLACK HILLS BENTONITE

No one ECP bonding clay is a cure-all. No one bonding clay can possibly do all foundry jobs equally well. Black Hills Bentonite excels in the respects named at the right. If these are the properties you need, then by all means select this pure colloidal Wyoming bentonite. It is extremely strong, uniform and dependable. If you require different qualities, there are four other ECP products (see list below) and their many combinations from which to arrive at the *one right* mix for your purpose.

ECP maintains a continuous research program — experimenting, testing, sorting out, collecting facts, coming to definite conclusions. This data is yours to command. If it does not suffice, we will be glad to tackle your individual problem with you in your own plant.

EASTERN CLAY PRODUCTS INC.
EIFORT, OHIO

1 DRY STRENGTH — higher than for any other clay.

2 HOT STRENGTH — higher than for any other clay.

3 RESILIENCE — higher than for any other clay.

4 Not equalled by any other bonding clay in the combination of high green permeability plus high dry and hot strength.

Also
VERY HIGH GREEN STRENGTH
VERY HIGH GREEN PERMEABILITY

ECP
DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

All TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

Manual on Training Women Prepared

A new manual, "Training Women for War Work", has been prepared by Apprentice-Training Service, War Manpower Commission, for the guidance of training directors, women counselors, and others charged with manning and training responsibilities in war production plants. Training procedures that have been developed during the last two years are not only greatly increasing the efficiency of women war production workers, but are encouraging them to remain on the job. This bulletin, compiled by Mary Curran, ATS Training Specialist, is a correlation of successful training methods used by outstanding manufacturers. It outlines various features which have entered into successful training programs in plants employing women.

This manual may be obtained by writing to Apprentice-Training Service, Bureau of Training, War Manpower Commission, Washington.

Terminate Charcoal Pig Operations

Manpower shortage in cutting chemical cordwood has resulted in the permanent cessation of operations by Antrim Iron Co., Antrim, Mich., producer of charcoal pig iron and chemicals since 1886. Sawmill operations will continue to complete cutting of the firm's remaining stand of virgin timber. Pig iron and chemical plants will be held intact for removal to a new location, perhaps to Mexico or South America.

Greater War Effort Pledged by Workers

Employes of the Clark Tructractor Co., Battle Creek, Mich., assembled recently to pledge themselves for still greater effort in their war work. They unanimously signed the following pledge, which was underwritten by the shop committee and read by the employes as a group: "We, the men and women of Clark, in Battle Creek, Michigan, in all humility of spirit and in reverent attitude, dedicate ourselves to the high task of serving God and Country through our daily work. May the spirit of our loyalty and devotion be like the spirit of our co-workers in uniform as they serve our Cause, our nation and ourselves, even unto the sacrifice of life itself."

Wins A.S.M.E. Award

American Society of Mechanical Engineers has presented the Charles T. Main Award for 1943 to Mitchell C. Kazen, employe of Ford Motor Co. and recent graduate of the University of Detroit, for the best paper submitted in the society's annual contest open to students of engineering in American and Canadian colleges.

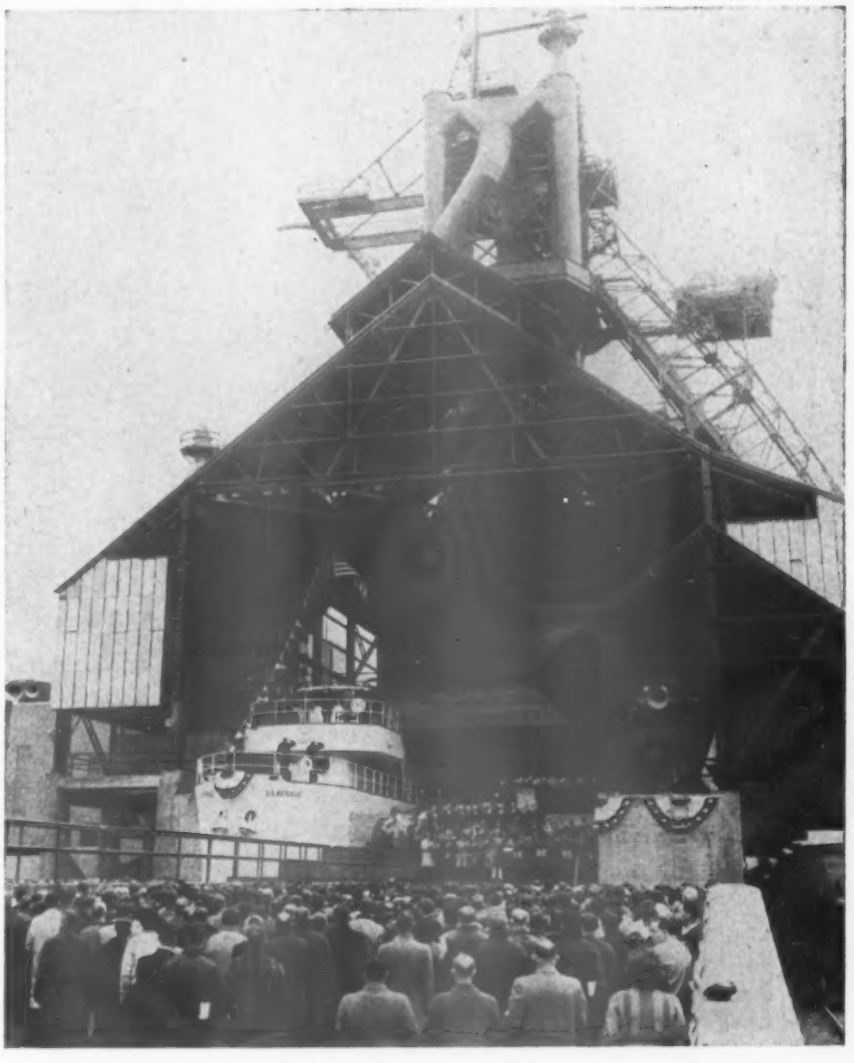
Welding and Cutting Fire Prevention

To instruct users of welding and cutting equipment in reducing potential fire losses, the International Acetylene Association has prepared a convenient, 16-page, pocket-size booklet entitled "Preventing Welding and Cutting Fires." It may be obtained in reasonable quantities without charge directly from the association, 30 East Forty-Second Street, New York 17, or from any manufacturer of oxygen, acetylene, carbide, or welding and cutting equipment.

Aids Production of Cast Armor Steel

Scarcity of specially graded silica sand for cores and molds used in production of cast armor steel has led to an increased application of mechanically reclaimed sand mixed with pulverized resin. According to Hercules Powder Co., Wilmington, Del., one foundry producing 5000 tons of steel castings per month has reduced its new sand requirements from 2500 to 600 tons a month by using resin in the form of Truline binder. The resin, which may be mixed with new or reclaimed sand, is said to shorten production time since it bakes rapidly, and has been found especially effective with sands containing clay.

Republic Lights Furnace, Receives "M"



Double ceremonies were participated in by the 4000 employes and management of Republic Steel Corp. in the Cleveland district on Oct. 28. Lighting of the corporation's new 1300-ton blast furnace by Tom M. Girdler, chairman, was followed by the presentation of the "M" pennant, Victory Fleet flag and merit badges of the United States Maritime Commission, in recognition of Republic's record plate production. The "M" award was made by Rear Adm. Howard L. Vickery, vice chairman of the Maritime Commission, from the bridge of the S. S. REPUBLIC, *built in the shadow of the stack for the presentation*

How to Make

ARMY E NAVY

THE AMERICAN MOLDER

TRADE MARK REG. U. S. PAT. OFF.

WORLD'S LARGEST BUILDERS

a Big Cleanup in RECORD Time

WHEELABRATOR Airless Blast Cleaning

WE wish you could step into some of the foundries that are using the airless Wheelabrator and see for yourself the tremendous loads that are being cleaned in a matter of only a few minutes.

In the mill type machines—the Wheelabrator Tumblasts—loads seldom run over 15 minutes. Most jobs are finished in from 5 to 10 minutes, including loading and unloading time. Seven Tumblast sizes are available ranging from the small 15″ x 20″ mill (1 cu. ft. capacity) to the largest mill, the 60″ x 96″ (63 cu. ft. capacity).

The table type machines—the Wheelabrator Tablasts—are likewise rapid production units. At top speed they will clean much faster than a workman can change the work on the table. Sizes are available for every requirement.

Of important significance to buyers of special production equipment are the many successful engineering achievements made by American in the field of Specially Designed Wheelabrator Cabinets, in which the invention and development of unique work-handling features have utilized the potentialities of airless blasting to the fullest possible extent. The exceptional performance of these machines on hundreds of special applications such as cylinder blocks, armor plate, brake drums, sanitary ware, tank turrets, etc. has been the keynote of their extensive use among top flight industrial plants.

Read more about the accomplishments of these machines in the adjoining column. Then, to satisfy yourself that they will do the same for you, ask to have a test-cleaning made on your own products.

SOME BIG CLEAN-UPS

- *A Wheelabrator Tumblast* (36″ x 42″) is cleaning 35 machine gun bases, weighing 22 lbs., each in only 18 minutes. The previous sandblast method required 3 hours.
- *A Wheelabrator Special Cabinet* at Spring City Foundry Co. cleans 4 to 6 tons of miscellaneous steel castings per hour. The castings vary in weight from 1 lb. to 1 ton each.
- *A Wheelabrator Tablast* (No. 2 multi-table type) is cleaning 8,000 lbs. of heat treated tractor bull gears per hour for a large farm equipment manufacturer. The gears weigh 70 to 80 lbs. apiece.
- *A Wheelabrator Tumblast* (48″ x 42″) cleans 22 tons of gray iron textile parts in less than 5 hours at the Draper Corp., Spartanburg, South Carolina.
- *A Wheelabrator Tablast* (6′ plain table type) cleaning manganese bronze gear blanks and other bronze castings produces as much work in 3½ hours as formerly required all day and part of the second shift using tumbling barrels at Pontiac Foundry and Machine Co.

American

FOUNDRY EQUIPMENT CO.

505 S. BYRKIT ST. MISHAWAKA, IND.

OF AIRLESS BLAST EQUIPMENT

the adventures of BILL

BY PAT DWYER

Drawings By RICHEY

I DON'T think," Bill said the other night, "that I ever showed you a newspaper clipping sent me early this past summer from an old friend in California. The letter reads: The enclosed clipping from a local paper will inform you of the latest and most improved method of making steel in the blast furnace. This here now California air must have something in it. What is your professional opinion regarding the addition of a shot of ipecac to the burden to make the furnace spew?

"The clipping titled 'Kaiser Mill Will Pour First Steel on May 14' continued: 'Steel will issue for the first time May 14 from Henry Kaiser's giant new blast furnace at Fontana. On that day before employes of the West Coast's first steel mill the industrial wizard will open the hearth to pour the first steel ingots produced since the plant began operation. The blast furnace was blown in on Dec. 30, 1942. Two days later the first pig iron to be cast on the West Coast was poured. Now, with that pig iron, plus scrap and certain raw materials, the furnace will spew forth steel'."

"A truly re-mark-able performance," I admitted. "Must be the air. I trust you rose to the occasion and mowed down this crop of baloney."

"You can't mow down that kind of stuff. It is like a Scotch thistle. You cut it down in one place and it pops up in another. However, I did write him:

" 'I was greatly pleased to hear from you and to note that the old eye is as keen as ever in spotting the fakers, the bluffers and literary counterfeiters. The sublime confidence with which these downy birds write about subjects of which they have not the slightest knowledge would be kind of laughable and pathetic if it were not for the fact that the great American public believes implicitly any statement published in a newspaper. Of course this belief is carefully fostered by the publishers who continually harp on the string that all the writers are experts, and all the material is screened, analyzed and tested by supermen in the newspaper offices before it goes to the printer.

" 'In the particular item you spotted and in many others on which I have commented in recent months, probably no harm has been done the readers. The great majority know no more about the subject than the inspired writers. The feature that gets under my skin, is that these same lads or their contemporaries discuss other and more serious and significant affairs with the same sublime confidence and ignorance, and the poor gullible public gobbles it down and then regurgitates it as gospel to others or to one another. A second and more serious feature is that a great deal of misleading information is published deliberately. Months and sometimes years afterward, some person writes a book or an article, calmly and in the majority of instances boastfully stating how this propaganda material was prepared, broadcast and swallowed by the public. You probably remember George Creel's revealing articles after the last war.

" 'I don't know if a good dose of ipecac or nux vomica would increase the spewing power of a blast furnace, but I do know that any person familiar with the manufacture of iron and steel, does not need an emetic after reading items similar to the one you forwarded in your recently highly esteemed communication. Keep a tight grip, old boy, on your emotions and physical reactions.' "

"A very noble effort," I assured Bill, "one that would earn you a citation in any branch of the armed service. However, one good turn deserves another. Let no day pass without rendering a kindness to a brother and all that kind of stuff. I shall now read you a highly scientific and technical paper, presumably prepared for a meeting of the water works association or maybe the plumbers. How the copy got tangled up in my mail, I wouldn't know, but I have certain dark suspicions. The paper is entitled 'Some More or Less Random Notes Touching on The Flow of Fluids Through The Stems of Tobacco Pipes'. To get the full benefit, listen!

Martyrs to science score another victory

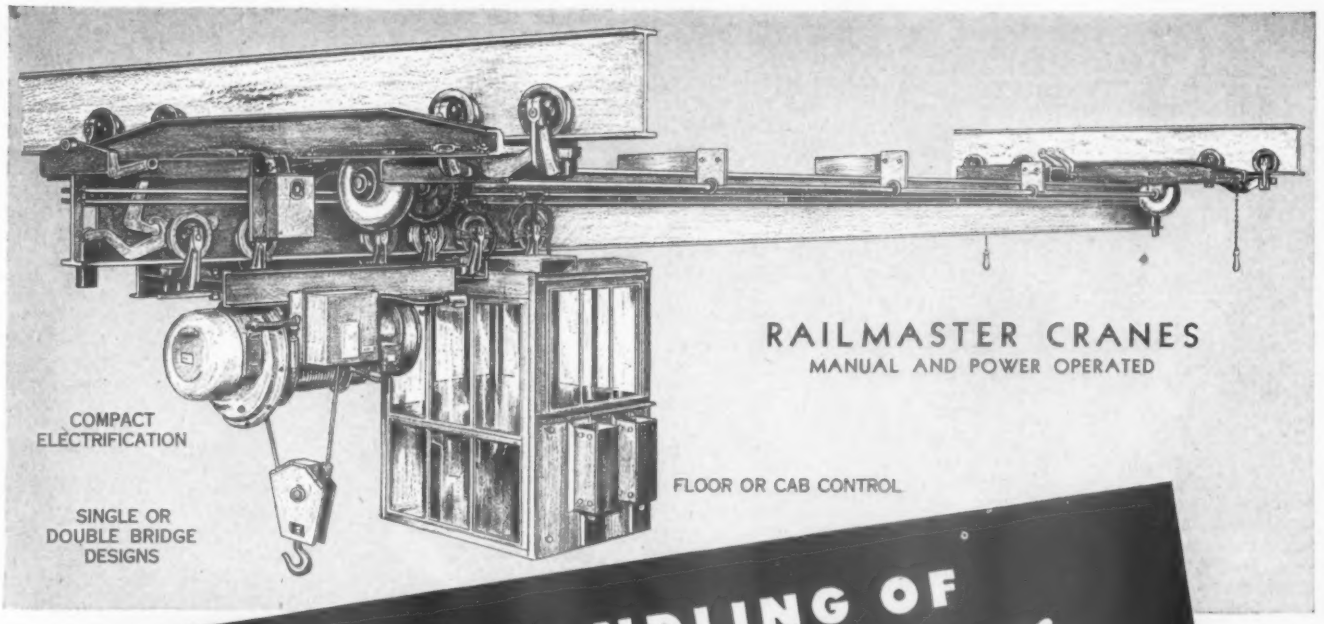
Many empirical formulas, or if you want to be finicky about the thing, formulae, have been proposed to settle the problem of the flow of liquids or juices in and through the stems of tobacco pipes. Origin of these juices, chemical analysis, comparative viscosity, bubble and squeak intensity and duration under various operating conditions are factors now under observation. Results of this investigation will be published—well, not to put too fine a point upon it—as soon as they are ready. And what are you going to do about it? Surely you would not expect us to rush into print with a job with all the loose ends flying! Ridiculous!

Now that the point has been settled to the satisfaction of one and all we may return to the formulae. Up to the present time these empirical and in many instances shockingly crude pieces of work are extremely limited and can be applied only where the conditions of the problem closely approach or approximate the conditions prevailing during the experiment from which the formulae were derived, or upon which the formulas—my error—formulae were based. Please restrain your curiosity. A question period may or may not be provided later. We shall see.

The formulas—we might as well call a spade a spade—rather happy touch since we are digging for information—the formulas are more or less complicated, if you know what we mean and therefore are omitted from the present presentation. No use gumming up the works. However, it may not be out of place to point out that the $\frac{Pi}{T}$ factor in all these formulas is an exceedingly variable variable, ranging from one end of the pipe stem to the other end and practically beyond control. A long series of experiments conducted by Prof. O. L. D. Piper at the University of Smokemup[1] provided the old boy with free tobacco for many years but led to no definite conclusions with one notable exception. Intensity and rate of flow are increased to a remarkable degree while (a) smoking in the rain, (b) while swimming in a lake, pond, river or pool and (c) under a shower or in the bath tub.

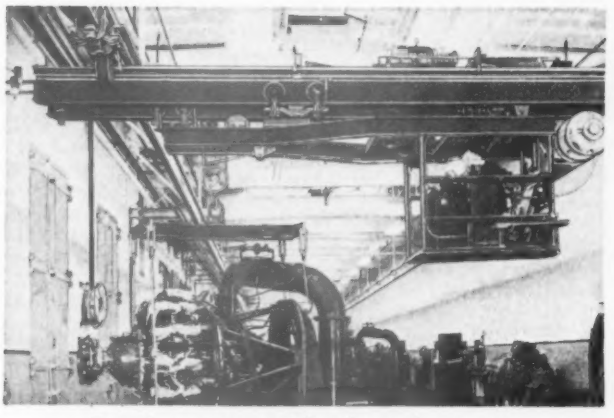
Prof. Piper claims he prepared a partial chart with the abscissa in green and the ordinates in red and with pink, pur-

(*Continued on page* 144)



FLEXIBLE HANDLING OF *Massive Production*

B-28 Bomber Makes Maiden Flight on RailMaster Crane.



Spotting motors with telescoping crane.

MASSIVE loads set up no problem when American MonoRail RailMaster Cranes are on the job. They are not limited to bridging a single span but, with their special interlocking and twin bridge designs, they can cover any area with any type of handling equipment.

American MonoRail Systems, too, are adaptable to many handling problems, offering versatile application without lengthy engineering or costly adjustment. Let an American MonoRail Engineer explain the advantages of overhead handling without any obligation to you.

THE AMERICAN MONORAIL CO.

13104 Athens Avenue **Cleveland 7, Ohio**

★ SEND FOR BULLETIN C-1. A 56 PAGE BOOK SHOWING SUCCESSFUL APPLICATIONS OF AMERICAN MONORAIL SYSTEMS.

(*Continued from page* 142)

ple and yellow curve lines representing respectively clay, wood and corn cob pipes in action. Unfortunately the chart is no longer in existence. A near sighted and color blind student picked it up one day under the mistaken impression it was a genuine Ringdangdo[3] depicting a sun rise in the Alps, and sent it home to his Aunt Hattie. She promptly converted it into a trappy little hat or bonnet, wore it for the usual two or three weeks and then threw it into the ash can or the waste paper pile in the cellar. As the Bard of Avon cynically remarked once upon a time "All is well that ends well".

In a more recent investigation conducted by Nick O. Teen and N. E. Wood Nickels[3] special attention was devoted to the size, shape and approximate age of the pipe. Secondary and supplementary work, not yet completed, and slated for future publication as an addendum or an appendix, or something, dealt with the results of using various brands of tobacco. A tabulation of the tests is available to any person curious enough to want to read it. Since we prepared the thing, it has no further interest, therefore it is not included in this presentation. A somewhat curious feature noted by the authors is that the quantity, quality and velocity of flow in the pipe stems depend to a considerable extent on the personalities of the smokers. Greatest volume and speed were developed by the natural drips and droolers and this of course is in accordance with the universal Law of Compensation. These birds, a more or less total loss in practically all forms of endeavor, can make more noise sucking a pipe, than two pigs under a gate or the flutes and picolos in the early part of the William Tell overture.

Character of the tobacco exerted a profound influence, irrespective of the size, shape or cubical content of the pipe, or the age, draft or other personal characteristics of the smoker, temporarily converted into a suction or exhaust fan attached to the end of the pipe stem furthest from the bowl. Contrary to the expectation the turbulence, squeaks and merry bubbling were more pronounced in a little short clay pipe[4] (also known as a cutty, T.D., or sled runner) than in the church warden variety with a stem as long as a cloth yard shaft[5].

Slightly viscous but fairly stream lined flow was noted in the stems of pipes loaded with the so called better brands of tobacco which according to the flamboyant advertisements have been sterilized, neutralized, dehydrated and perfumed to a point where they closely approximate the texture, feel and appearance of hay seed. A pipeful of this tobacco lasts about five (5) minutes by any reliable stop watch. Later the life expectancy is even less when the pipe bowl becomes practically choked with a deposit of hydrocarbons, pitch, tar and other smelly material that can't be burned with an acetylene torch, or dissolved in an acid bath. Owners of these pipes spend about half their time excavating the deposits with jack knives, brace and bits, jack hammers, or special reamers. Note: Up to the present no commercial or household use has been found for the residue, although random and unauthenticated experiments indicate efficacy of the material in sudden collapse of ants, bugs, cockroaches, cut worms, termites, also rats, mice, snakes, lizards and other pests and vermin. One good sniff, it is claimed, and they are gone with the wind. Unfortunately, domestic help and sometimes the Little Pal herself also take wings and fly away. Thereby providing certain foxy husbands with Ideas.

The cheaper brands of tobacco produce a flow well below the critical range with the CO and CO_2 in about equal proportions and with the Btus's distributed uniformly. A gob of this stuff popping unexpectedly into the smoker's mouth usually brings the experiment to a close with a startled exclamation which reveals the exclaimer's familiarity with sacred names and related subjects.

Tourists in Quebec and the lower Maritime Provinces of Canada occasionally are lured into trying Tabac Canadien, or another potent brand manufactured in Montreal and popularly supposed to be impregnated with molasses, opium, salt peter and hydrochloric acid. They find that although a turbulent motion exists throughout the greater portion of the pipe diameter, there is always a laminar sublayer of fluid at the pipe wall moving in viscous flow in the opposite direction. This feature probably is responsible for reducing the mortality rate among the birds of passage.

Flow in pipes always is accompanied by friction (domestic) and consequently by energy in work. Energy lost in friction is converted into heat energy. The heat thus produced may be absorbed entirely by the fluid (if the fuel is Tabac Canadien) producing adiabatic flow. In extreme case the wife goes home to mother. If the energy is entirely dissipated through the pipe walls (isothermal flow) she merely sniffs and gives all the other usual manifestations of the suffering martyr bound to the stake. This is a tough old world.

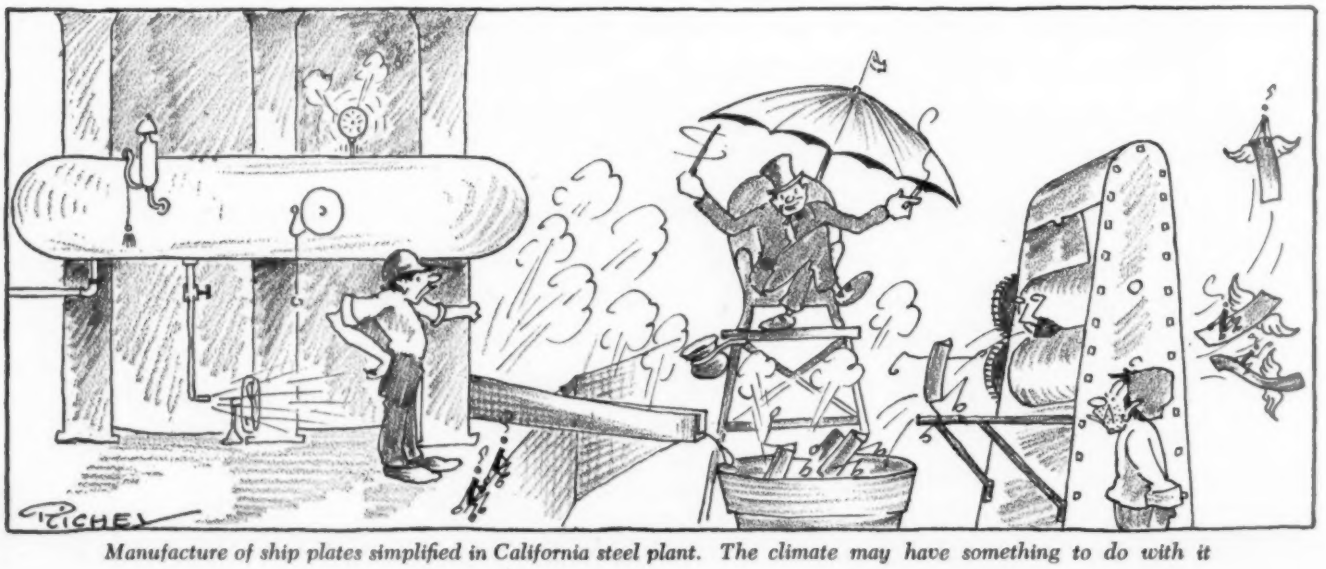
A promising field yet remains unexplored. We refer, as of course the astute reader already has guessed, to the use of snipes and cigar butts as pipe tobacco. The moisture content is higher than usual, particularly if the—ah—items have been retrieved from the gutter, or have been exposed all night to a heavy dew. Second-hand tobacco chews, playfully and intimately referred to in the foundry industry as *old soldiers*, fall into the same category.

The internal diameter of the pipe in which flow is taking place influences to a great extent the friction loss of breath per foot of pipe. For a given rate of flow the pressure drop per foot of pipe varies perversely with the fifth power of the diameter. Since the interior of pipes in service usually, or in fact invariably become coated with scale, dirt, tubercules, scar tissue and googum, the prudent experimenter makes allowance for expected changes in diameter. At stated intervals he runs a straw from the broom, a straightened hair pin or wire clip through the passage. In the dear old days now beyond recall, he used a commercial device put out by the brush makers.

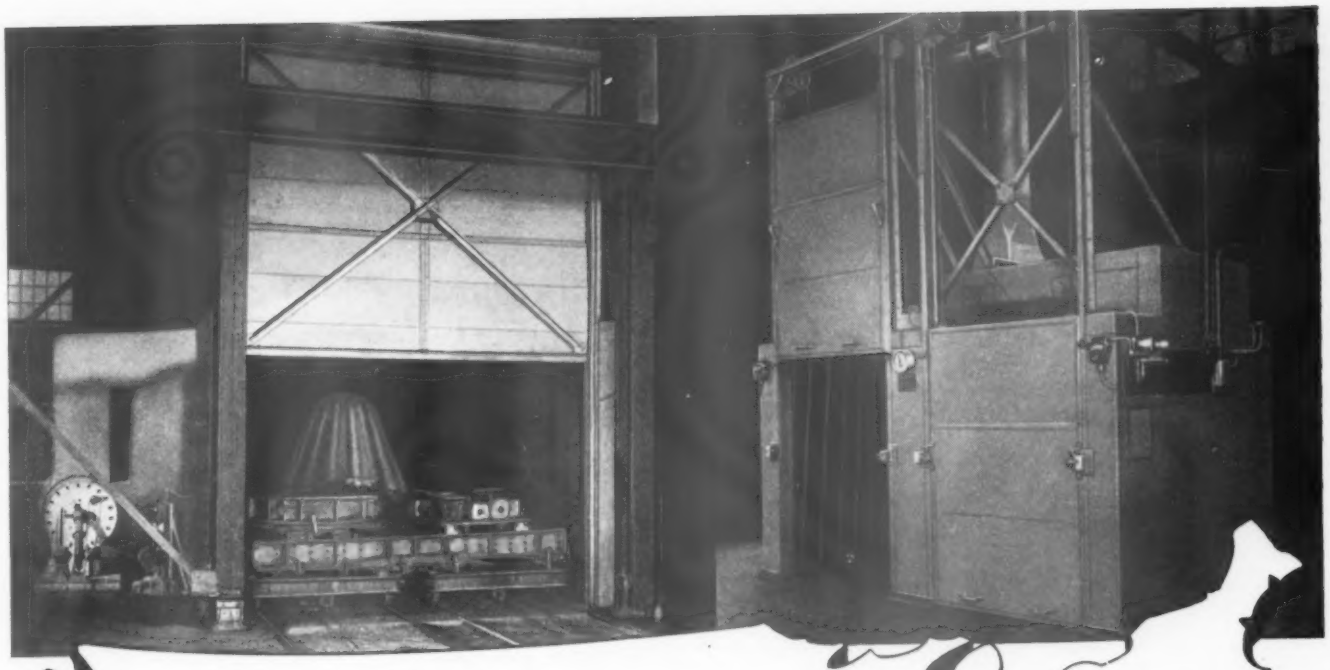
Finally—and about time says you—while the nature of the flow in straights and bends has been investigated thoroughly and many interesting facts have

(*Concluded on page* 167)

[3]Smoker's Club *Transactions*, Vol. 4, p. 178.
[3]One of the Old Masters, now happily extinct.
[3]Pipe Dreams, *Tobacco Age*, Vol. 3, p. 7.
[4]From popular song *Everybody Works But Father*, circa. 1900.
[5]Slings and Arrows from *My Book of Memories*, Sally Sharp, Chapter 407.



Manufacture of ship plates simplified in California steel plant. The climate may have something to do with it



PROMISES FULFILLED

Not every satisfied customer makes the effort to voice his attitude which, after all, is human. Therefore comments like the following are significant.

"Our whole organization is sold on your service. The results are so satisfying that we are purchasing additional ovens from you."

"I never had seen such uniform cores. Bakes faster than expected, and gas consumption shows economy. Several callers have said these ovens are just what they need."

"Even better than we expected and large and small cores can be baked at the same time and anywhere in the oven with perfect results."

YBCo

YOUNG
BROTHERS COMPANY
Industrial Ovens for all purposes
6508 MACK AVENUE
DETROIT, MICHIGAN

BRANCH OFFICES IN PRINCIPAL INDUSTRIAL CENTERS • In California at: 277 Seventh St., San Francisco and 406 So. Main St., Los Angeles

National Engineering Wins "E" Pennant

Principals at recent ceremonies for awarding of Army-Navy "E" to National Engineering Co., Chicago. First row, left to right: Barney Castor, master mechanic, and oldest employe; H. S. Simpson, chairman of the board; Dr. Preston Bradley, Peoples Church of Chicago, and master of ceremonies; Ruth P. Waschau, secretary; Bruce L. Simpson, president; Col. C. J. Otjen, Army representative; Lieut. Comm. Lester B. Knight, Navy representative; Chester Coyner, engineering department, and employes' representative. Second row: Otto Drolshagen, advance engineering section; Elsie Bruechtel, order department; Kenneth Simonsen, mechanical section; A. C. Christensen, chief engineer

Knerr Heads Metal Treating Group

Horace Knerr, president, Metlab Co., Philadelphia, was elected president of the Metal Treating Institute at the organization's eleventh annual meeting at Chicago, Oct. 17, in connection with the National Metal Congress. He succeeds Charles I. Wesley, president, Wesley Steel Treating Co., Milwaukee.

A. D. Bach, president, New England Metallurgical Corp., South Boston, Mass., was named vice president, and Stewart N. Clarkson, 420 Lexington avenue, New York, secretary.

New directors include N. M. Salkover, vice president and general manager, Queen City Steel Treating Co., Cincinnati; L. A. Lindberg, president, Lindberg Steel Treating Co., Chicago; Walter G. Hamilton, president, Accurate Steel Treating Co., Chicago; W. W. Farrar, president, Cook Heat Treating Corp., Los Angeles; and Charles G. Heilman, president, Commonwealth Industries Inc., Detroit.

Foreign Patents Are Abstracted

The chemical patents and patent applications vested by the Alien Property Custodian have been abstracted by the Chicago Section, American Chemical Society and are now being indexed by a committee of the Science and Technology Group, Special Libraries Association. Beginning in January, 1944, these abstracts will be published in 31 classified, indexed pamphlets, to be followed by a master index and a supplement of new abstracts. The prices, if demand is adequate to justify them, will be $1 for any booklet and $25 for all 33 booklets. Orders should be placed not later than Dec. 10 to make sure of receiving copies. Order blanks may be had from the Alien Property Custodian, Field Building, Chicago 3.

OPA Names Industry Advisory Group

A Cast Iron Hot Water Supply Boiler Industry Advisory Committee composed of six officials of manufacturing firms has been appointed by the Office of Price Administration. The committee includes:

David L. Deen, sales manager, Freed Heater & Stoker Co., Collegeville, Pa.; George L. Harberger, sales manager, Eastern Foundry Co., Boyertown, Pa.; Max D. Rose, vice president, American Radiator & Standard Sanitary Corp., Pittsburgh; F. S. Ross, president, American Boiler & Foundry Co., Milan, Mich.; Frank Werner, president, Werner Foundry Co., Lansdale, Pa.; E. R. Westphal, plant manager, Weil McLain Co., Michigan City, Ind.

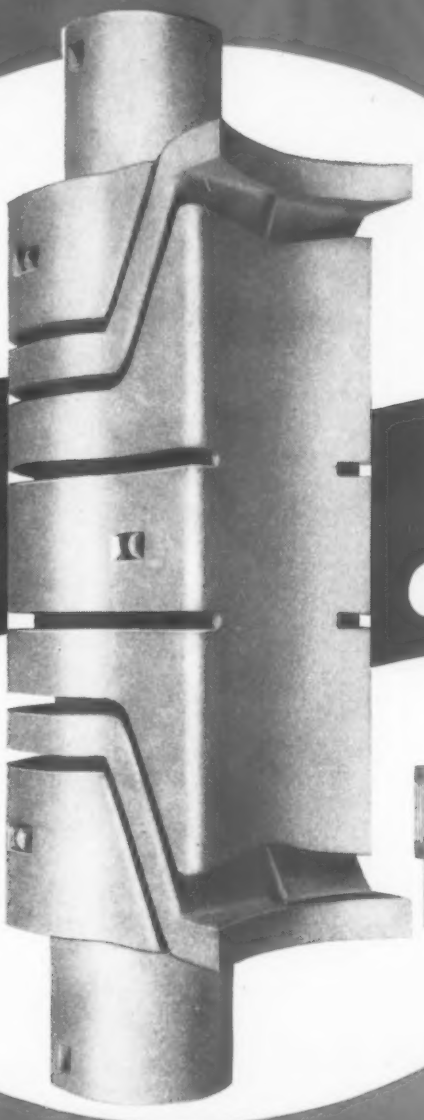
Three Stars on Flags

Farrel-Birmingham Co. Inc., Ansonia, Conn., one of the first companies to receive the Navy "E" early in 1942, has received its third renewal of the award. Plants at Ansonia and Derby, Conn., and Buffalo now fly the burgee with three stars, indicating receipt of this recognition for four consecutive 6-month periods.

Castings Vital Part of PT Boat Engine

Some of the many aluminum sand castings going into the construction of the Packard marine engine which powers the Navy's PT boats, as well as the engine itself, are shown in this view of a portion of an exhibit held recently by the Detroit plant of Aluminum Co. of America for the benefit of the plant's employes. Ribbons from the castings on the table at the right lead to that part of the engine where the castings are installed. In addition to sand castings, the Detroit Alcoa plant produces a number of permanent mold aluminum castings for war equipment

To Build a Better Bridge of Ships



CORES for many of the mammoth castings used in the building of Liberty engines* for the U. S. Merchant Marine are made with Certified dependable and economical core oils.

This large jobbing foundry, like so many other foundries producing castings of steel, grey iron and non-ferrous—have found the *nine quality factors* of Certified core oil decidedly profitable. These *nine quality factors*, common only to Certified core oils, are: (1) maximum core strength; (2) thorough grain coating; (3) minimum baking time; (4) easy shake-out; (5) minimized gas and smoke; (6) works clean in the boxes; (7) meets all government specifications; (8) maximum economy; and (9) thoroughly dependable uniform quality.

Let Scotty Waugh, the Core Oil Doctor, prescribe the proper analyses of core oil for your particular work. Your labor cost will go down, your core production will go up.

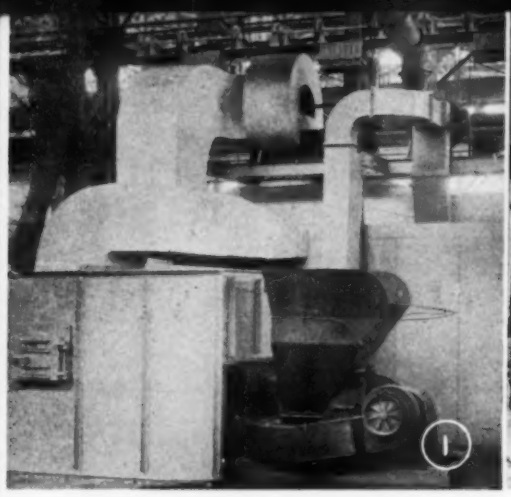
*Name of foundry on request.

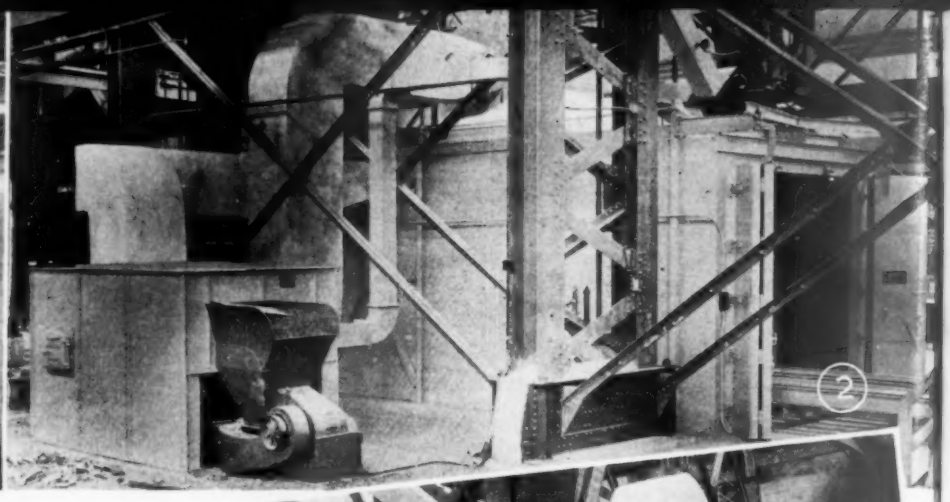
CERTIFIED CORE OIL & MFG. CO.

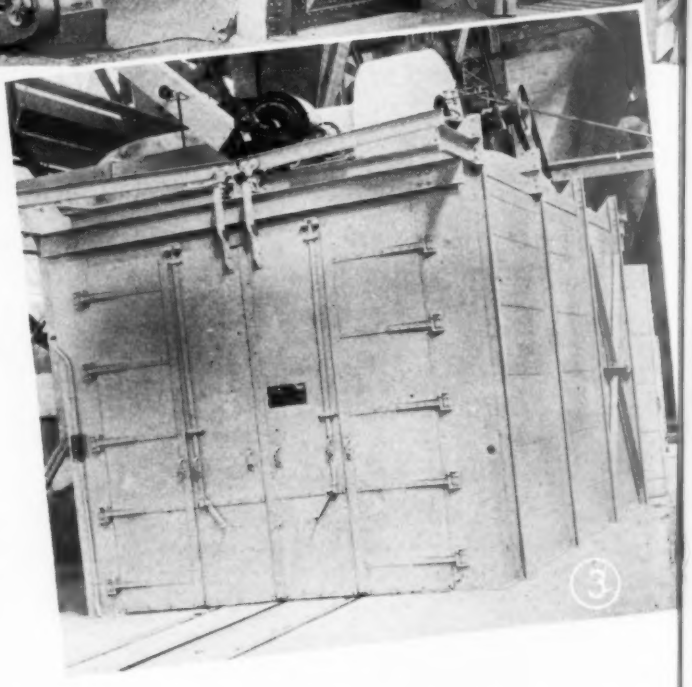
"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and Representatives: Buffalo, N. Y. Elmira, N. Y. Worcester, Mass. Reading, Pa. Newark, N. J. St. Louis, Mo. New Orleans, La. Houston, Tex. Chattanooga, Tenn. Minneapolis, Minn. Portland, Ore.







CORE OVEN STOKERS

Fired With

ANTHRACITE COAL

Fig. 1 to 5—View of stoker-fired core ovens installed by prominent eastern steel foundry. Stokers use hard coal for fuel

AN INTERESTING application of an anthracite stoker fired, recirculating air heating system to a core oven recently was installed in a prominent eastern steel foundry. The system was designed by the Foundry Equipment Co., Cleveland. The grade of anthracite known as buckwheat is employed as fuel, and the results to date are highly satisfactory.

Anthracite coal has been used before in hand firing and also in stoker sub-floor firing, but it is believed that the three automatically controlled recirculating air heating systems in this foundry represent the most efficient use of hard coal. Reserve of heating capacity and flexibility of operation show an interesting advancement in the use of anthracite for heating foundry ovens. Control of oven temperature is claimed to be as close as that obtained from gas or oil fuel, and operating conditions are equally as clean.

The installation includes three units —two double-end, car type ovens with motorized sub-floor car pullers, and one battery of three rack type ovens. The usual vertical-lift, counterbalanced doors are not used on the car type ovens due to limited overhead clearance. Each end of the oven is equipped with special jack-knife doors with one end of each half suspended from a trolley to insure smooth movement from the fully closed to fully opened position. The recirculating air fan and the interlocked mechanical ventilation system are mounted on the roof of the oven, as shown in Fig. 3. The stoker heater assembly and the recirculating air duct system connections are shown in Fig. 2. This view also shows the small amount of space required for opening the doors.

The opposite end of the same oven is shown in Fig. 4 with the doors opened and a rear view of the stoker heater unit and duct connections. The roller conveyor lines in the foreground facilitate transfer of the cores to the bays on either side where the molds are made and assembled. Fig. 5 shows the front of the battery of three small core ovens, each with a capacity of one rack. A track is laid in the center oven to accommodate a small car in the event that a car should be required to replace a rack at any time. With ample overhead clearance, these ovens are equipped with vertical lift doors. This view also shows the compact arrangement of fans, motors and external duct work in the air distribution system. The rear of the small ovens is shown in Fig. 1. This view of the

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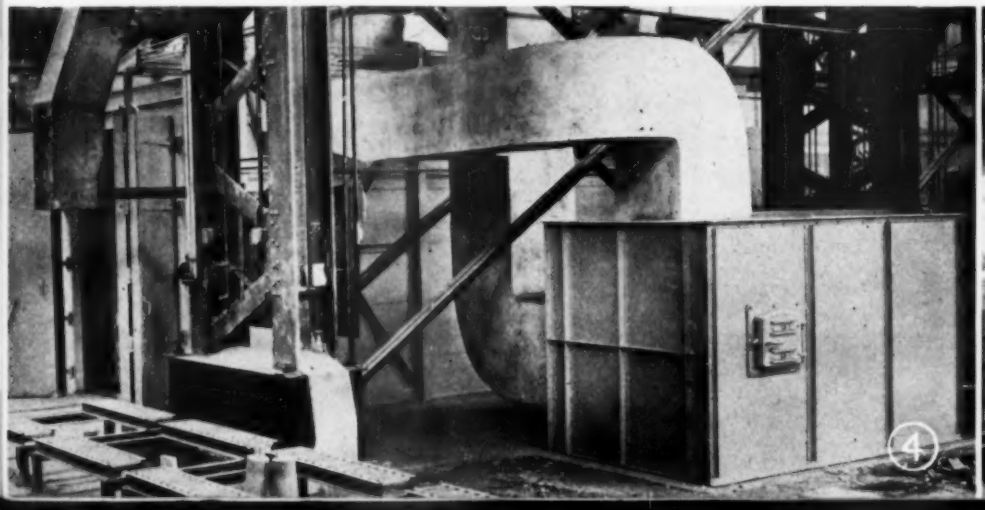
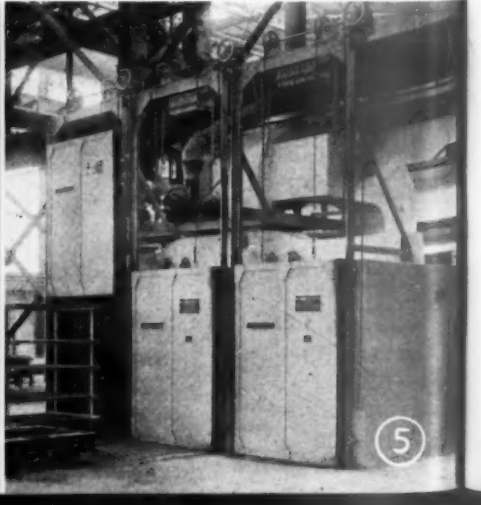
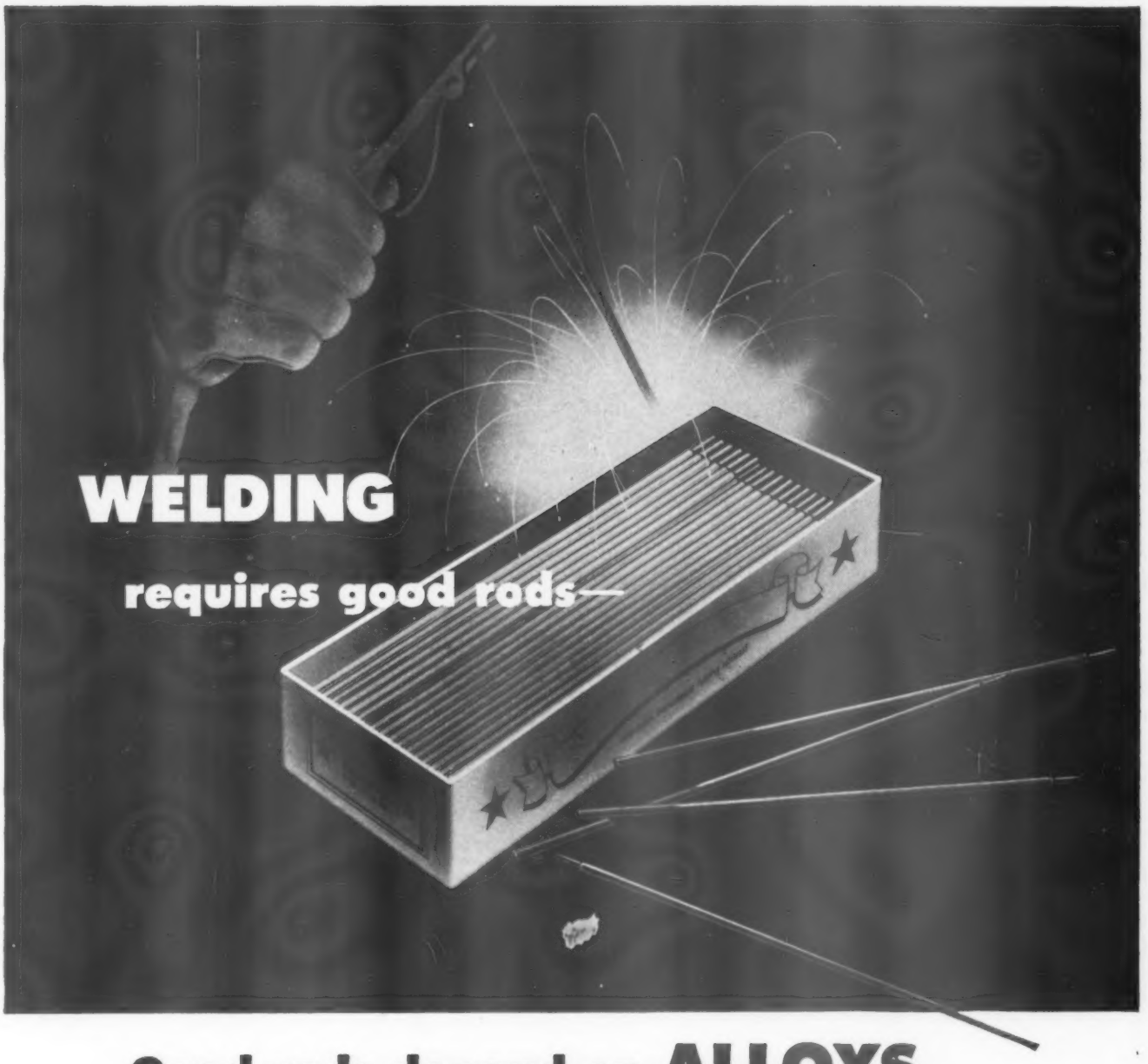






Good rods depend on ALLOYS

The tremendous increase of production in our metal-working industries has been due to many factors, among which welding is important.

Welding rods of highly specialized character are required for varied and exacting uses; and to meet the need, alloys enter more and more into welding rod manufacture.

Alloys are incorporated either in the coating or in the rod itself — either for fluxing purposes or to make the weld stronger.

The Molybdenum Corporation has for years been a large supplier of alloys, metal powders, and chemicals for the welding rod manufacturer, among its products being these:

Ferro-Molybdenum • Powders of Molybdenum
Ferro-Tungsten • Powders of Tungsten
Calcium Boride • Manganese Boride • Ferro-Boron

Any inquiry concerning the availability of Molybdenum, Tungsten, or Boron will be gladly answered.

AMERICAN Production, American Distribution, American Control—Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.

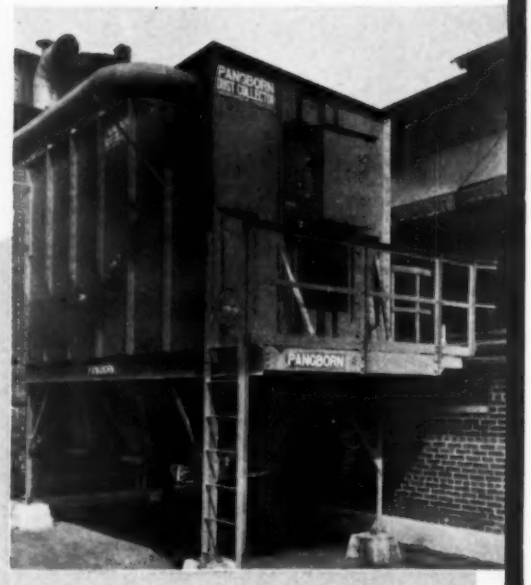
MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

DUST CONTROL

EFFICIENT & EFFECTIVE

Thru PANGBORN
• ENGINEERING
• EXPERIENCE
• RESEARCH



All Dust Control systems do not have the benefit of an exact and separate engineering service, covering forty years experience in the field, and scientific research to assure progress and development. These ingredients are available in Pangborn Dust Control and provide outstanding qualities which serve to guarantee efficient and effective solutions to industry's many and varied dust problems.

The Pangborn Dust Control department is chiefly concerned with the task of correlating and evaluating the many facts about industrial Dust Control which it has gleaned from its many years of service to industry. These facts—results of actual operating experience in the field—have a great bearing on the design and construction of the equipment which is offered to industry to combat the great variety of problems.

These facts are tested and proven in a complete research laboratory, whose job it is to make sure that each piece of Pangborn equipment will satisfactorily handle the work to which it is assigned. Pangborn's three-pronged offensive against industrial dust—Engineering, Experience, Research—is a guarantee of complete and exacting coverage for your dust problem—use these facilities today and be sure of the best in Dust Control!

"Pangborn Dust Control Is Protection For Production"

PANGBORN

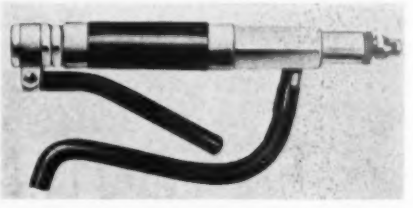
WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION • HAGERSTOWN, MD.

NEW EQUIPMENT AND SUPPLIES

Foundry Spray Gun

Lonn Mfg. Co. Inc., 131 East New York Street, Indianapolis is introducing a new all-purpose spray gun, designed especially for continuous spraying operations in foundries. It may also be used as vacuum suction tool to suck sand out of molds, and as a blow gun for drying and



cleaning purposes. As a spray gun, the tool handles heavier solvents such as water paints and lamp black, and has a lifting capacity of 2 gallons per minute on 70-pound air pressure. It is converted into a suction cleaner by removing the nozzle and dropping the suction hose into the mold. For use as an air unit, it is only necessary to remove the fluid hose from the container. The unit contains only three working parts, which may be disassembled quickly for cleaning. It contains no packing or springs. A special injector is said to give the gun exceptionally high nozzle volume. The gun is made in three sizes— ¼, ⅜ and ½-inch, and each unit is supplied with 8 feet of neoprene fluid suction hose.

Extinguisher Seal

General Detroit Corp., 2272 East Jefferson, Detroit 7, is offering a new low-priced device to protect fire extinguishers

against tampering or clogging. Made of heavy water-repellent stock, the seal is made in three designs. Foam and soda acid extinguishers are protected by a stitch envelope which slips over the hose and fastens around the control valve. Vaporizing liquid extinguishers are fitted with two caps, one covering the pump

The twelve months just ending have been the most productive in American history . . . and in the world's history as well. Ships, planes, tanks, guns — billions upon billions of dollars' worth of them — have been created by American industry for America and our allies.

Victory is nearer by one year's production

We feel justly proud of the part Penolyn Core Oil has played in that record of production. Because it bakes fast, cleans fast, minimizes gas-forming tendencies and cuts rejects, more Penolyn has been demanded than ever before.

As a result of this demand, we have at times had to "stretch" the available supply. If you are one of those who had to be satisfied with "rationed" orders, or if delays in delivery have caused inconvenience, please remember that the Penolyn Core Oil which *is* being delivered is helping to shorten the war — and speed the day when your peacetime production may again have first call.

Penola
Reg. U.S. Pat. Off.

PITTSBURGH, PA.

NEW YORK
CHICAGO
DETROIT
ST. LOUIS

★

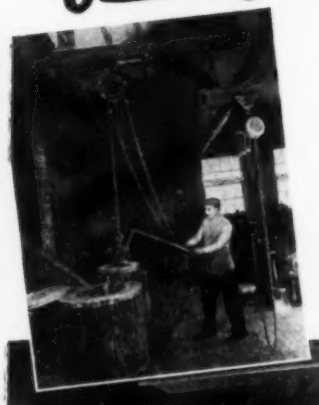
from furnace to pouring

VIA

CHICAGO TRAMRAIL

MONORAIL CRANES

Faster . . . Safer



Photos courtesy Atlantic Brass Works—Chicago

★ View at top shows man pulling a crucible of molten brass, which will soon be whisked from the furnace to the floor by a small-size Chicago Tramrail Furnace Crane. The skimming operation done, the load is then switched to the larger overlapping Monorail Crane (bottom view) which spans all molding points for rapid distribution of the liquid metal. All flasks can be poured direct from this crane.

A low-cost installation of this type is but one of many hundreds that have been designed and "built-in" by Chicago Tramrail engineers for speedier and safer overall foundry operation.

PILLAR TYPE No. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

and at the **"SHAKE-OUT"** *use* **JIB CRANES. Here's Why:**

These nimble Jib Cranes swing fully 360° to receive loads from all overhead cranes that converge at the shake-out.

And Jib Cranes are handling this operation with greater flexibility and speed, meanwhile releasing overhead cranes for other work. When ordering be sure to state lifting capacity, length of arm and distance from floor to arm. Illustrated circulars obtainable on request. Write

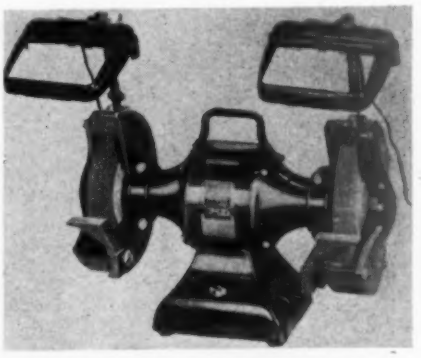
CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

end and the other protecting the nozzle. Carbon dioxide extinguishers are guarded by a cup-type envelope which fastens over the nozzle horn. All types are held in place by a tamper-proof wired seal.

Grinder Shield

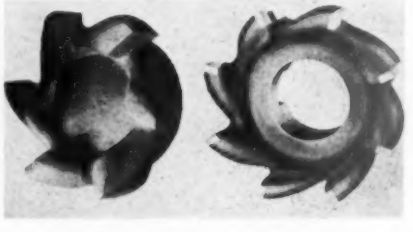
Boyer Campbell Co., 6540 Antoine Street, Detroit, announces a new model grinder shield which provides properly directed light and protection for the face and eyes from flying particles. The



frame is molded from a high-impact resisting plastic material, and electrical parts are located in a completely insulated chamber. The window is of non-shatterable glass, and the bayonet type lamps are resistant to vibration and set in flush with the frame. The mounting bracket is adjustable.

Milling Cutter Body

Farrel-Birmingham Co. Inc., Ansonia, Conn., has developed milling cutter bodies of meehanite which can be machined for carbide or cast alloy tips within a broad range of rake and spiral angles. Higher operating speeds, reduced chatter and longer tip life are said



to result from the better damping capacity of meehanite compared with steel, while the closer coefficient of expansion helps to make possible a superior bond between body and tip. A variety of body castings and cutting tips can be kept in stock by machine shops to use in making up cutters. The user faces, bores and slots the hub to suit requirements, mills tooth seats, and brazes on the desired tips.

Test Magnet

Dings Magnetic Separator Co., 509 East Smith Street, Milwaukee 7, has available a horseshoe-shaped magnet

MAGNESIUM and ALUMINUM CASTINGS demand these 5 features of the modern

ROSS CORE OVENS

1 UNIFORM TEMPERATURES: Large quantities of circulated air insure uniform distribution of heat at low temperature differences.

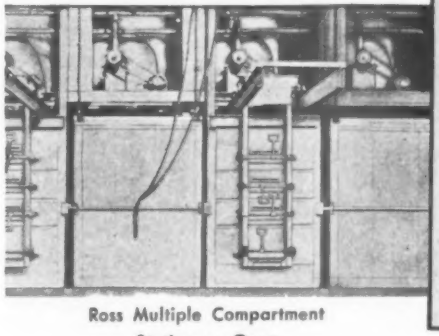
2 AIR DISTRIBUTION: Use of special nozzles increases air flow and turbulence, prevents stratification and insures uniformity throughout full oven.

3 MAXIMUM CAPACITY: Temperature limits are small enough for proper baking of all sizes of cores on every shelf.

4 CONTROLLED TEMPERATURE CURVE IN OVEN: Temperature is controlled in zones in conveyor ovens.

5 PANEL CONSTRUCTION: Insulated Steel Panels provide the advantages of—minimum through metal, quick assembly and minimum heat loss.

Continuous Core Drying Oven for Sprayed Cores.



Ross Multiple Compartment Stationary Oven

SOME ROSS CORE AND HEAT TREAT OVEN INSTALLATIONS

Aluminum Company of America
American Locomotive Company
Bohn Aluminum & Brass Co.
Chevrolet Motor Co.
Chrysler Corporation
National Aluminum Cylinder Head Co.
Pratt & Whitney Aircraft Corp.
Packard Motor Company
Reynolds Metals Company
Sperry Gyroscope Company, Inc.
Tube Turns, Inc.
Westinghouse Electrical & Manufacturing Co.
Wright Aeronautical Corporation
and others

STATIONARY CONTINUOUS CONVEYOR

The shift from iron to the new light weight metals has brought new problems in core baking. Radical differences in properties of the light metals require more exacting control and present new problems in the preparation of the cores. ROSS Core Ovens have solved these problems through their ability to insure utmost uniformity and control of temperatures and air distribution. Their design embodies 25 years experience in the handling and control of air for processing.

Our engineering department will gladly supply full details on request. Write us.

ROSS SYSTEMS

J.O.ROSS ENGINEERING CORP.

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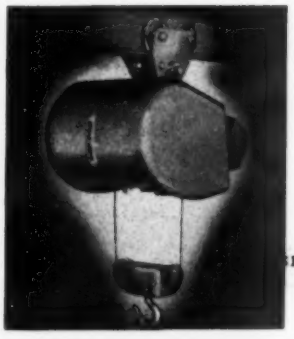
CHICAGO • DETROIT • MONTREAL

CONTROL OF AIR FOR MODERN INDUSTRY

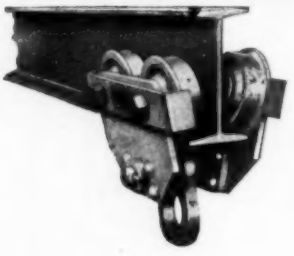
CONCO

MATERIALS HANDLING EQUIPMENT



TORPEDO HOIST

Available in capacities of 250-, 500- and 1000-lbs., for hook, bolt or trolley suspension. Fast, easy operation, with push button control, double drum construction, limit switch, electric brake. Simply, ruggedly built . . . . easily movable from place to place.



I-BEAM TROLLEY

A smooth rolling, carefully balanced trolley, available in four models, in capacities from ¼- through 10-tons. Plain or geared types with Hyatt Roller or plain bearings. All sizes tested well beyond rated capacity. Widely used in foundry installation.

DIFFERENTIAL

A light weight, low cost hoist in capacities of ¼-, ½-, 1-, 1½- and 2-tons. Quality built, but practical even for limited use.

SPUR GEAR

A high speed, high quality hoist in capacities from ¼- through 20-tons. Tests to 150% of rated load. Ideal with Conco light cranes and trolleys.

JIB CRANE

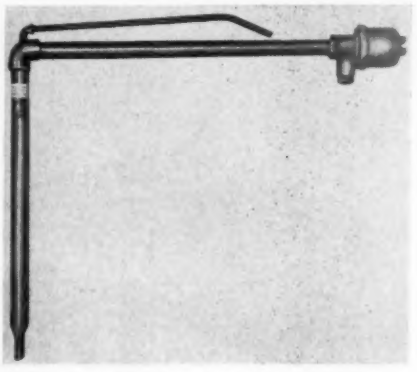
Shown with Conco Hoist. Is ideal for foundry use. Revolves in complete circle. Wall bracket type also available. Capacity ½- to 2-tons.

CONCO ENGINEERING WORKS
Division of H. D. Conkey & Company 53 Grove St., Mendota, Illinois

measuring 2½ inches high by 3 inches wide with pole bases ¾ x ¾-inch, suitable for test work in chemical, physical and mineralogical laboratories as well as in smelting and refining plants. The unit weighs 14½ ounces.

Thermocouple

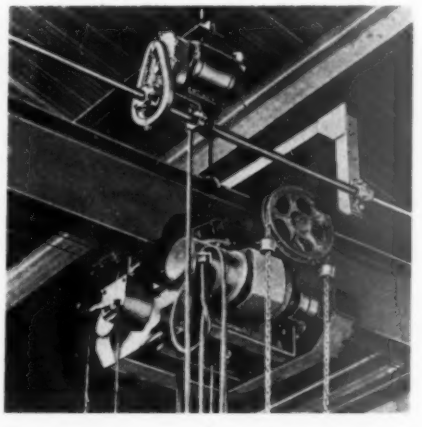
Claud S. Gordon Co., 3000 South Wallace Street, Chicago, has developed a new vent-type thermocouple, which is said to eliminate the collection of gases



and to reduce contamination to a minimum. A vent at the top permits the gas to escape and, by artificial circulation admits the right amount of pure air to take its place. When convenient, an air connection is made with the blower and a very small amount of air is circulated through the tube. Thermocouple life is claimed to be doubled or tripled by use of this design.

Crane Travel Drive

Northern Engineering Works, Atwater at Chene, Detroit, has developed a drive for motorizing hand-traveled bridges of overhead cranes. Consisting essentially



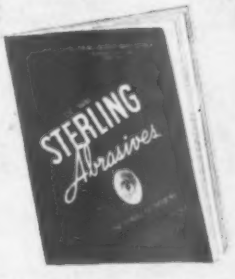
of a chain drive, electric motor and control, the device is said to require only 2 or 3 hours for a mechanic to install. No part of the crane except the old hand chain needs to be disassembled. The pendant push button for operating the unit can either be located at a fixed point on the bridge or can be arranged to travel with the hoist.

Together, Let's Build That Extra Weapon Today!

• There isn't a foundry that does not depend upon grinding wheels to turn out the castings of war. Correctly planned grinding wheels, plus experienced workers, are the winning combination that will speed up our industrial effort to a victorious tempo.

• Realizing that every extra grinding wheel manufactured means more weapons of war, Sterling workers are proud to join with foundrymen in seeing that production is accelerated every day.

• Correct "Wheels of Industry" are available to do that better casting cleaning job for you. Sterling workers—in our laboratories, plant, and offices—are pledged to do everything possible to help you turn out the castings each day for that extra tank, gun, truck, or ship. Speeding casting cleaning with quick delivery of Sterling Grinding Wheels will accomplish it.



Every Sterling Wheel necessary for foundry grinding is listed in Catalog No. 43. This important book will be sent upon request.

• May our engineer call and help you attain better victory production from your grinding wheels? There is no obligation . . ask for this service, backed by years of grinding experience in foundries all over the country.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

A WAR OF

Movement

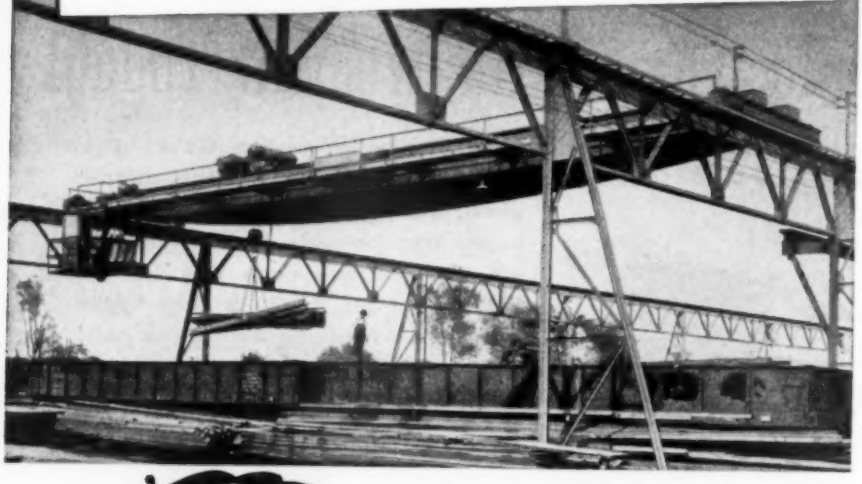
BEGINS AT HOME

The job of seeing to it that materials and supplies are at the right place at the right time is no less important on the home front than on the battle fronts. Industrial schedules *must* be maintained if war objectives are to be gained.

Shepard Niles has long enjoyed the reputation of manufacturing the most complete line of cranes and hoists in America. Because of this and because they are specialists, manufacturing *only* cranes and hoists, they are in a position to recommend the proper type of equipment for any materials-handling problem you may have.

Overhead Electric Traveling Cranes are made in either welded or riveted box girder construction, in capacities from 1 ton to 450 tons. Representatives in or near all war production centers are available for consultation to help you determine where important materials-handling economies can be made.

Write for descriptive literature.



Typical 4-Motor, Cab-Operated, Over-running Electric Traveling Crane in yard service. Because all operating parts are completely sealed against dust, dirt and moisture, Shepard Niles Cranes and Hoists are equally serviceable indoors or out.

Shepard Niles

CRANE & HOIST CORPORATION

360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

Foundry Equipment Builders' Meeting

(*Continued from page* 136)

found the "Index of Foundry Equipment Orders" an indispensable tool in connection with the successful operation of its business.

Mr. Simpson described the five subdivisions of the report which are published each month in addition to the figures for over-all industry activity. He showed further that the increase in the number of companies participating in this interchange is too low in comparison with the good to be derived from active co-operation. He mentioned also the value to member companies in dealing with governmental departments and having before them information of the type made possible through the development and publication of this monthly statistical interchange.

During the next session, devoted to "The Foundry Equipment Industry—Its Present and Future Position," each company representative present gave information on foundry equipment sales and shipments during the first six months of the year as compared with the first six months of 1942, as well as for the third quarter of 1943 compared with the same period a year earlier. Definite information was given on the backlog Dec. 31, 1942, as compared with Jan. 1, 1943.

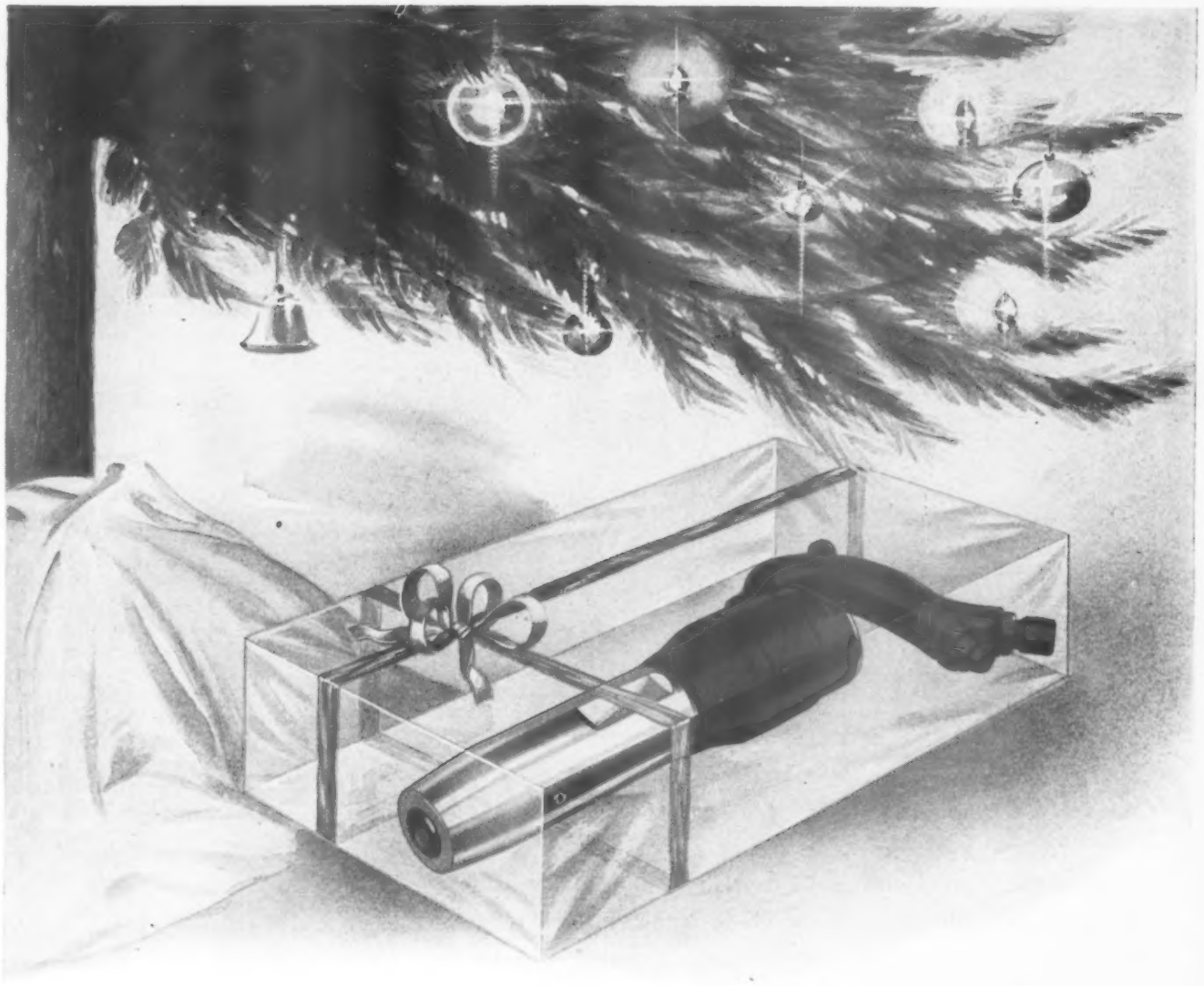
Backlogs Are Contracting

All of this information indicates that while the foundry equipment industry still is extremely busy, backlogs are contracting and may be expected to continue in that direction. The contraction has not as yet been nearly as sharp as in certain other fields, including the machine tool building industry.

The meeting was then given over to a roundtable discussiion of a number of subjects confronting manufacturers. The opening statement was made by Herbert S. Hersey, C. O. Bartlett & Snow Co., Cleveland, who presented in a clean-cut logical manner, the different situations which must be taken into full account in the postwar period. Mr. Hersey then spoke briefly on the subject "Order Hold Ups—Cancellations," describing his company's experiences in the engineering contracting field. It was recognized that this particular field presents certain problems aside from those ordinarily met in these times.

Executive Secretary Arthur J. Tuscany called attention to the Procurement Regulation No. 15 dealing with "Termination of Contracts for the Convenience of the Government" which sets out important phases in connection with this subject. Copies of this material can be secured from the Office of the Federal Register, National Archives, Washington, for 10 cents a copy. The material also was printed in the *Federal Register* of August 24, 1943.

The executive secretary also called attention to the War Department Technical



Good Tools Don't Grow on Christmas Trees

Good tools have to be designed out of experience and then built to do a job—and a chipping hammer for foundry service is no exception. It has to be especially well designed and built to stand the gaff month after month. All the parts that take the wear have to be hard chrome plated—often on hard-to-get alloy steels. The balance—you call it "feel"—has to be right.

Good tools don't grow on Christmas trees—but a new "Master" Chipping Hammer or "Master" Sand Rammer in your hands will make every working day in 1944 seem more like Christmas—and you'll do more work and be less tired at the day's end.

Prompt delivery on new "Master" Tools. Three to five weeks delivery on pneumatic percussion tools completely rebuilt to meet "Master" Standards. Write for descriptive literature.

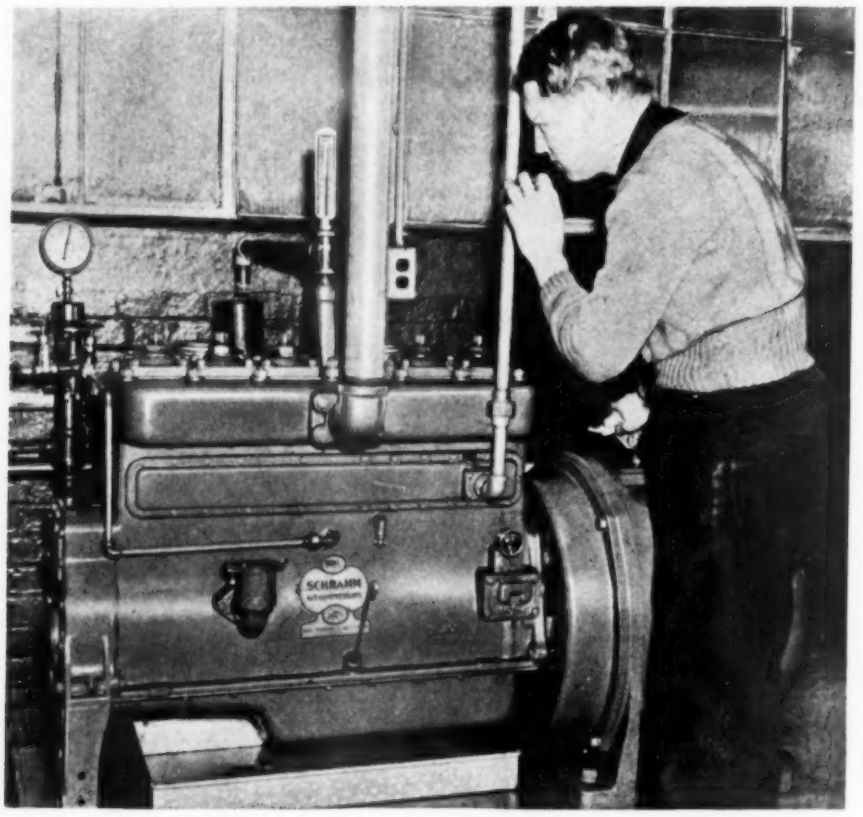
Makers of "MASTER" Tools

MASTER TOOL COMPANY, Inc.

5605 HERMAN AVENUE • CLEVELAND 2, OHIO

Rebuilders of all makes of Pneumatic Tools

A COMPLETE AIR PLANT



Producing 210 cu. ft. of actual air

A COMPACT unit with built-in motor, the illustrated Schramm Air Compressor is designed to give you speedy heavy-duty service at all times . . . and is a match for the 24-hour-a-day service demanded by today's war industries.

Schramm Air Compressors are lightweight, compact and easy to handle—vitally important now when manpower is at a premium. Compactness is due in large measure to vertical cylinders, cast en-bloc, and the absence of overhanging or projecting parts. Multi cylinders eliminate vibration and necessity of elaborate foundations.

Importantly, Schramm Air Compressors are water-cooled, contain vertical, cylinder-in-line compressor construction, and have mechanical intake valves which are positive, efficient and modern. For further details write for catalog 42-S.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

Manual TM 14-320 entitled "War Department Termination Accounting Manual" dated July 7, 1943. A copy of this material is procurable from the Government Printing Office, Washington, for 25 cents per copy.

F. W. Klatt, W. W. Sly Mfg. Co., Cleveland, made the opening remarks on the session devoted to "Maximum Price Regulation." Mr. Klatt showed that when Maximum Price Regulation 136 under which the foundry equipment industry operates was first issued, it was ample protection. Subsequent rapid changes, particularly the drastic reduction in manufacturing volume, have altered conditions. He counseled close watch to the situation. The session closed with the suggestion that everyone keep in close touch with the subject and that at a later date it may be desirable if not necessary for the industry to discuss the matter with the Office of Price Administration.

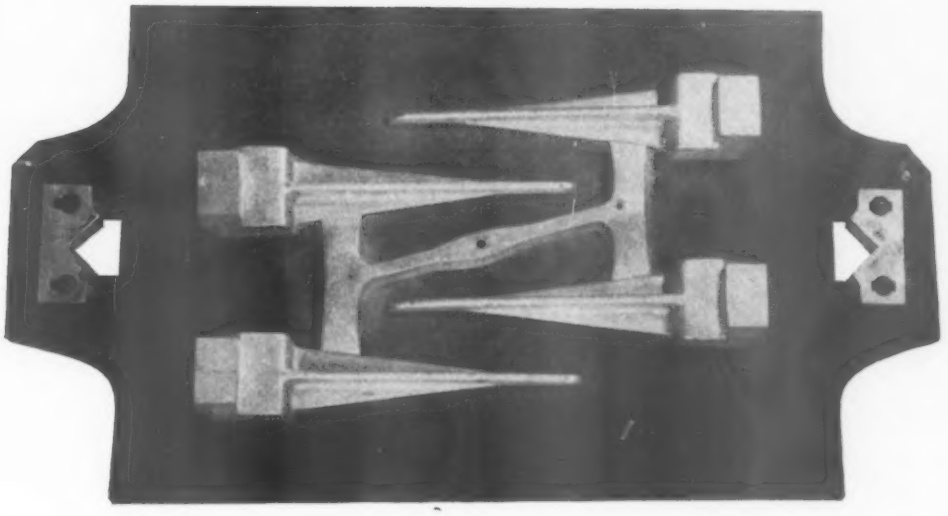
The subject of "Renegotiation" was introduced by P. J. Potter, Pangborn Corp., Hagerstown, Md., and the discussion was particularly interesting. A show of hands indicated that at least three companies had definitely completed handling of the renegotiation subject with the Price Adjustment Board. These companies by and large reported that, everything considered, reasonable satisfactory results were obtained. Many companies are still going through the renegotiation phase. Detailed handling of different angles of this broad subject were discussed, questions answered, and information given.

Suggest Other Fields

"Subcontracting" was discussed by E. F. Nell, Milwaukee Foundry Equipment Co., Milwaukee, Wis. Mr. Nell showed how this activity was quite helpful to his company and recommended that the matter be carefully investigated by all manufacturers. It was emphasized during the discussion that it is highly important that manufacturers be prepared to continue their activity in some other field in the event their backlog reaches a point where their force may not be kept fully occupied. Once key men and skilled mechanics switch to other lines, it is difficult if not impossible to retrieve them.

The subject of "Taxes" was discussed by W. L. Dean, Mathews Conveyer Co., Ellwood City, Pa. He recommended contact with congressmen, preferably through personal discussion. He drew attention to the growing types of what can be described as "illogical" taxes, namely the kind which are used to set up unnecessary bureaus which seem to make it their principal business to develop ways and means to inaugurate new taxes. During the discussion period the Illinois retailers' occupation tax was discussed. A number of manufacturers have increased their prices to provide for this tax, and it was pointed out that OPA permits this change. It was moved, seconded and voted that a tax committee be named

LIGNOLITE
PATTERN PLATES



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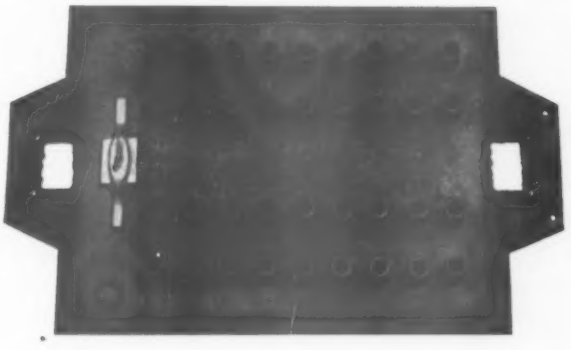
Available in all flask sizes, 3/8" to 2" thick. Standard plates are octagonal in shape with 1" allowance for flask and 2½" allowance for ears. Sheets are also available for own cutting. Sizes are 46" x 46" for thicknesses from 3/8" to 1½" inclusive; 40" x 40" for thicknesses over 1½". Please write for sample and complete information.



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DIVISION OF MARATHON PAPER MILLS COMPANY
ROTHSCHILD **WISCONSIN**

When our daring paratroopers leap upon the enemy from the air, action is sudden, fast, decisive.

Fast action, decisive action is just as vital on the home front. Here at Acme, we keep stepping on the gas for all-out production in the shortest possible time. Whether it's patterns, dies, heat-treated aluminum castings, or specialized tools needed by war plants, our watchword remains, "Do It Right—And Do It Fast."

The service of our engineering staff is available for specific recommendations to metal-working war plants. Inquiries receive prompt attention.

For VICTORY buy WAR BONDS and STAMPS

ACME PATTERN & TOOL COMPANY, Inc.
DAYTON, OHIO

Heat-Treated Aluminum Castings—Patterns—Tools—Tool Designing—Production Processing

to assist members to keep in touch with tax developments.

Announcement was made that Ralph W. Hisey, Osborn Mfg. Co., Cleveland, was re-elected president of the association, O. A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind., vice president, and Arthur J. Tuscany, Trade Organization and Management, Standard Building, Cleveland, executive secretary and treasurer.

A.F.A. Sponsors New Apprentice Contest

The Apprentice Training committee of the American Foundrymen's Association through its contest sub-committee has announced that it will continue its annual molding and pattern competitions for 1944. These annual contests, since first held in 1924, have attracted considerable attention and promoted interest in organized foundry training. While it is realized by the committee that training programs have been to some extent disrupted by war conditions, it has decided that the contests should be continued even under these conditions.

The contest committee, under the chairmanship of C. W. Wade, training supervisor, foundry division, Caterpillar Tractor Co., Peoria, Ill., has in addition to Mr. Wade the following as members: Frank C. Cech, pattern instructor, Cleveland Trade School, Cleveland; H. L. Charlson, assistant works manager, American Steel Foundries, East Chicago, Ind.; James G. Goldie, foundry instructor, Cleveland Trade School, Cleveland; J. Morgan Johnson, vocational supervisor, Tri-City Manufacturers Association, Moline, Ill.; E. P. Meyer, general superintendent, Chain Belt Co., Milwaukee; G. A. Zabel, assistant superintendent, Universal Foundry Co., Oshkosh, Wis.

This committee has developed regulations governing the contests and provided for the holding of local elimination competitions in foundries and pattern shops throughout the country. Local competitions can be sponsored either by plant officials or by organized foundry groups or chapters. The A.F.A. committee provides patterns for the molding and blue prints for the pattern sections.

Entries from the local competitions will be forwarded to the national contest to be held during the Third Foundry War Production Congress in Buffalo, April 25-28. Prizes of $30, $20 and $10 will go to winners of first, second and third places, respectively, in each of the following four sections: steel molding, gray iron molding, non-ferrous molding, and patternmaking. Funds for the prizes are being furnished through the board of awards of the A.F.A.

Information on the contest and copies of the regulations may be secured by those interested by writing to the A.F.A. Apprentice Contest Committee, 222 West Adams Street, Chicago.

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WITH **LONGER LIFE**

IRONTON NOJOINT, a special type of plastic ramming refractory, was developed especially for lining receiving, mixing and desulphurizing ladles. So many foundries have been impressed with its resistance to the corrosive action of soda ash, they have found new uses for it.

It is now being used successfully for patching the melting zone of cupolas, especially in those foundries where "Purite" is used in the cupola. It also gives excellent service for lining cupola spouts, for tap holes and slag holes and for lining regular pouring ladles.

In non-ferrous foundries it is giving outstanding service in crucible furnaces and in oil fired rotary furnaces.

Let us help you solve your refractory problems.

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We give PROMPT ACTION to your specifications

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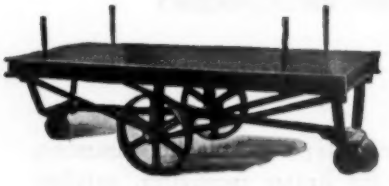

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on any car or truck problem . . . or send your specifications in any form, notes, drawings, etc.

INDUSTRIAL CAR BUILDERS FOR 40 YEARS

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COLUMBUS, OHIO

OBITUARY

ENRIQUE A. TOUCEDA, 77, consulting metallurgical engineer, professor of metallurgy, and authority on the malleable casting industry, died in Albany, N. Y., Oct. 20. Born in Cuba, Professor Touceda was graduated from Rensselaer Polytechnic

ENRIQUE TOUCEDA

Institute, Troy, N. Y., in 1887 with a degree in civil engineering. After graduation he joined the Troy Steel & Iron Co., and while in the service of this and other companies carried on a metallurgical consulting practice. In 1898 Professor Touceda went into business for himself in Albany as a consulting metallurgical engineer. A few years later he was appointed professor of metallurgy at Rensselaer institute, continuing in that capacity for many years in addition to his other activities. More recently he was professor emeritus and consultant to the department of metallurgical engineering of the institute.

In 1912 the American Malleable Castings Association, now the Malleable Founders Society, engaged Professor Touceda in a consulting capacity, which position he retained until his death. The author of numerous papers on malleable casting practice, and active in technical affairs of the American Foundrymen's Association, he was the first recipient of the John A. Penton Gold Medal awarded by the A. F. A. for conspicuous service to the foundry industry. His work on committees of various other technical societies in which he held membership likewise was extensive and valuable. These memberships included the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, Society of Automotive Engineers, American Society for Testing Materials, American Iron and Steel Institute, British Iron and Steel Institute, American Society for Metals, American Chemical Society, and British Institute of Foundrymen.

• • •

Julius K. Fons, 59, superintendent, Crucible Steel Castings Co., Milwaukee,

SAVE TIME, MONEY AND MATERIAL!

Use VELSICOL CORE OIL

RESIN MODIFIED TYPE

- HIGH TENSILE STRENGTH
- RAPID COLLAPSIBILITY
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Velsicol Core Oil is a modified resin type—preferred by leading foundries all over the country! Velsicol chemists have perfected our core oil—the Velsicol plant produces it under strictest quality specifications.

Velsicol Core Oil offers you many advantages! It is a natural for aluminum and magnesium castings because of its rapid collapsibility Yet it gives cores the desired tensile strength you need for accurate castings with any kind of metal. Its low gas content and uniform quality cut down rejects. Velsicol Core Oil actually saves you time, money and material.

Why fool around? Find out today how Velsicol Core Oil can bring you the three most important savings in speed-up wartime production! Find out today for yourself what Velsicol Core Oil can do—profit tomorrow.

Make the test in your own foundry! Write for samples and information.

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L-2039
5 each
149-Q-7A13
149-Q-7C13
141-R-9A15
144-R-8A14
149-R-8A14
149-R-8C14
Oxa. Res.
Report -
149-Q-7A13
Very Satis-
factory.
reordered -
86 on L-2369
24 on L-3149
100 " M-30
150 " M-264
100 " M-353
25 " M-363
75 " M-393
100 " M-432
200 " M-682
100 " M-908

M-1032
3 each
149-S-6A14
149-T-6A15
14-R-7A15
14-S-8F18
Oxa. Res.
14-S-8F18 very
satisfactory
reordered
50 on M-1233
100 " M-1441
100 " M-1453
200 " M-1611
100 " M-2270
200 " M-2297
200 " N-363
100 " N-544
100 " N-1173
100 " N-1500
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Plus WHEELPOWER
Minus WHEELCOST
PROVED BY RE-ORDERS

Company: A large steel corporation.

Work: Removing scale and imperfections from finished sections of open hearth rolled structural steel. Finish: of no consequence.

Machine: Rotor and Ingersoll-Rand high speed portable air grinders — wheel speed 4600 R.P.M.

Wheel: Type No. 1, 8" x 1" x 5/8", Oxaluma Resinoid.

Results: Repeated tests to determine exact grain and grade for maximum work and life of wheel showed a normal wheel life averaging 25% over wheel formerly used. This is another example of PLUS WHEELPOWER and MINUS WHEELCOST that is proving CORTLAND *for better snagging*.

For Better Snagging

CORTLAND
GRINDING WHEELS CORP.
CHESTER, MASSACHUSETTS

died in that city Oct. 8. He was one of the founders and a former vice president of Maynard Electric Steel Castings Co., Milwaukee.

• • •

Daniel J. Ryan, one of the founders of, and president, Allyne-Ryan Foundry Co., Cleveland, died Nov. 8 at the age of 79. Born in Brockville, Ont., he began his foundry career at the age of 14 in that city. After working in various foundries in Canada and in Detroit, Mr.

DANIEL J. RYAN

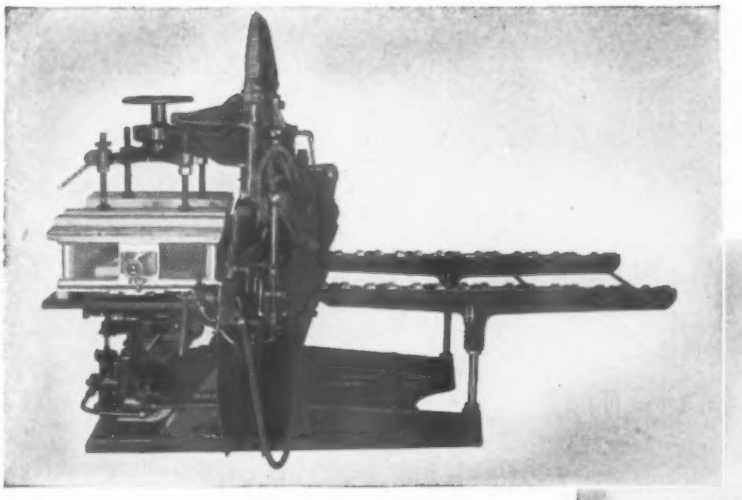
Ryan went to Cleveland in 1895 and entered employ of the National Malleable Castings Co. Two years later he joined the Van Wagner & Williams Co., where he developed the rigging for and made the first automobile cylinder block casting made in this country. In 1900 he was placed in charge of the Interstate Foundry Co., and remained with that firm until 1912 when he left to organize the Allyne-Ryan company. Mr. Ryan was well known throughout the foundry field for his ingenuity in applying short-cut methods and developing rigging for increasing castings production.

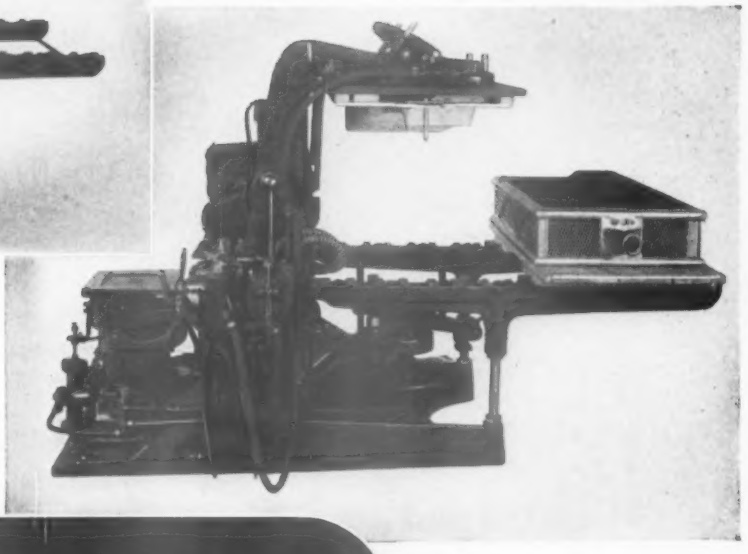
• • •

Hilbert Morey, assistant superintendent of aluminum foundry, Buick Motor Division, Flint, Mich., died in that city Sept. 20 after a five-month illness. He had been associated with foundry activities at Buick for 25 years, serving for many years as master mechanic in the gray iron division.

• • •

Dr. W. H. Hatfield, 61, noted British metallurgist, died Oct. 17. Following a study and training period at University College, Sheffield, he was in turn connected with Sir Henry Bessemer & Co., J. Crawley & Co., Thomas Firth & John Brown Ltd., and Firth-Vickers Stainless Steels Ltd. He wrote Cast Iron in The Light of Recent Research, in 1912, and Application of Science in The Steel Industry in 1928. He wrote many papers for various technical publications and always took a prominent part in technical association meetings. He was a Fellow of the Royal Society, doctor of metallurgy Sheffield University, Fellow of the Chemical Society, Institute of Physics,





Above—View of No. 815 Jolt, Roll-Over Pattern Draw Machine Clamped, Equalized, and ready for Roll-Over Operation.

At Right—View of same Machine after Rolling Over, Showing Perfect Pattern Draw.

A FAST HIGH PRODUCTION JOLT, ROLL-OVER PATTERN DRAW MACHINE FURNISHED IN THREE SIZES

• Johnston-Jennings Jolt Roll-Over Pattern Draw Machines meet every requirement for fast, easy, efficient work. They assure maximum production even with relatively unskilled operators,—and are standard equipment in most large aluminum and magnesium foundries. These machines are built in three sizes and require no pits. They are of open end construction and incorporate many design and operating refinements much appreciated by practical operating men. Our fully descriptive catalog giving complete details of this and other Johnston & Jennings molding machines furnished gladly on request — No obligation — Send for a copy today.

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A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

MARSCHKE GRINDERS

MARSCHKE NARROW TYPE PEDESTAL GRINDER

★ This illustration shows a Marschke Narrow Type Pedestal Grinder with 5 H.P. motor for 18" wheels but same type of Marschke machines are made in sizes ranging from 1 H.P. for 10" wheels to 7½ H.P. for 20" wheels!

For heavy duty snagging, the foundryman thinks in terms of 24" and 30" wheels powered with 25 or 30 H.P. motors and multi-speed or variable-speed drives. The conditions may call for massive Floor Stands or Swing Frame Grinders.

Whatever the requirements and whether power specifications are AC or DC there is a Marschke for each case, including — as shown — Direct-Drive, Single Speed machines in Wide or Narrow type for production cleaning of small and medium size castings.

Universally Adjustable Guards — All Marschke Pedestal Type Grinders are equipped with the famous Marschke Universally Adjustable Guards. The wheel opening can be set to any point around the wheel circumference. The sparklip is brought automatically to *proper position* whenever workrest is reset for wheel wear. All adjustments are made with permanently attached handles.

These guards are SAFE, CONVENIENT of operation and, therefore, EFFICIENT.

MARSCHKE 1, 2, 3, 5 and 7½ H. P. WIDE TYPE

These Wide Type Marschkes provide plenty of space between two operators and extra clearance between wheel and base. The longer spindles are supported on *four accurately aligned ball-bearings* . . . and like the Narrow Type Pedestal machines, are equipped with the Marschke Universally Adjustable Guards.

★ *There are over 70 standard specifications of Marschke Swing Frame, Floor Stand and Pedestal Grinders and Buffers—from 1 to 40 H. P. 10" to 30" wheels and built to machine tool standards.*

THE ★ MARSCHKE ★ LINE

MANUFACTURED & SOLD BY THE

VONNEGUT MOULDER CORPORATION

1839 Madison Ave., Indianapolis, Ind.

Institution of Chemical Engineering, Institute of Metals and vice president of the Iron & Steel Institute. At various periods he was the recipient of the Bessemer Gold Medal, the Compton Medal of the Institution of Automobile Engineers. He also was a Mappin medalist. In 1928 he delivered the Campbell Memorial Lecture at Philadelphia.

In addition to his business activities Dr. Hatfield was chairman of the committee on the Heterogeneity of Steel Ingots and chairman of the Alloy Steels Research Committee, also the Corrosion Committee of the Iron and Steel Institute. He was a member of the institute's Steel Castings Research committee, and of the Iron & Steel Industrial Research council.

• • •

Hugo R. Slivinski, 68, custodian of the Deering Works, International Harvester Co., Chicago, died Sept. 16 after 51 years of active service at that plant. Starting as a machinist apprentice in 1891, he later became assistant foreman of the special machine department, was made general foreman in 1905 and master mechanic in 1911. Mr. Slivinski retained the latter position until 1934 when he was appointed plant custodian. He was responsible for the development of numerous improved production methods in the foundry and other departments.

• • •

John F. Pitz, 68, president, Pitz Foundry Inc., Brooklyn, N. Y., which he established in 1910, died Oct. 17. Before establishing the gray iron foundry he conducted a pattern shop in New York. He also was head of the Loyal Textile Machinery Corp. and of Ames Hydrovac Corp., both of Brooklyn.

• • •

Anthony J. Gonter, coreroom superintendent at the foundry of Dodge Division of Chrysler Corp., and long active in affairs of the Detroit Chapter, American Foundrymen's Association, died in Detroit, Oct. 23.

• • •

Louis S. Boismenue, 69, formerly purchasing agent for American Steel Foundries, East St. Louis, Ill., died in that city, Oct. 5. He retired 5 years ago after 22 years of service.

• • •

John J. Grutza, 71, for 30 years foreman of the brass foundry of the Falk Corp., Milwaukee, died in that city Oct. 27.

• • •

William E. Hedgcock, vice president in charge of sales of American Car & Foundry Co., New York, and former purchasing agent for that company, died Oct. 26.

• • •

William M. Gale, 76, who retired in 1939 as secretary, International Harvester Co., Chicago, died Oct. 28 in that city. He had been associated with the company 36 years.

• • •

George L. L. Davis, 67, vice president in charge of sales of the Scullin Steel

Co., St. Louis, was killed Oct. 5 while on an inspection trip of the plant. Mr. Davis joined the company's sales department in 1910. He rose to vice president in charge of sales before returning to the East for a few years, and resumed the post upon rejoining Scullin in 1933.

• • •

Clarence H. Howard Jr., 44, a director of General Steel Castings Co., Philadelphia, died in St. Louis Oct. 22.

• • •

S. Bowles King, 64, assistant secretary Underwriters' Laboratories Inc., Chicago, died Oct. 25 in that city. Prior to joining the organization in 1936, he was for 31 years advertising manager, Sullivan Machinery Co., Michigan City, Ind.

• • •

Erich Duus, 83, president, Rempis & Duus Foundry Co., Grand Rapids, Mich., died Oct. 22.

• • •

Paul G. Miles, assistant secretary and purchasing agent of the Sessions Foundry Co., Bristol, Conn., died at his home in that city Sept. 24.

• • •

Henry L. Grede, 78, a director and one of the organizers of Grede Foundries Inc., Milwaukee, died Nov. 5.

• • •

Jacob J. Ripner, 57, founder and president of Aluminum Smelting & Refining Co., Cleveland, died Nov. 6.

• • •

Francis R. Harris, 87, founder of the Driver Harris Co., Harrison, N. J., died in Arlington, N. J., Oct. 24.

• • •

T. F. Wharton, 73, secretary-treasurer, Deere & Co., Moline, Ill., died in that city, Oct. 13.

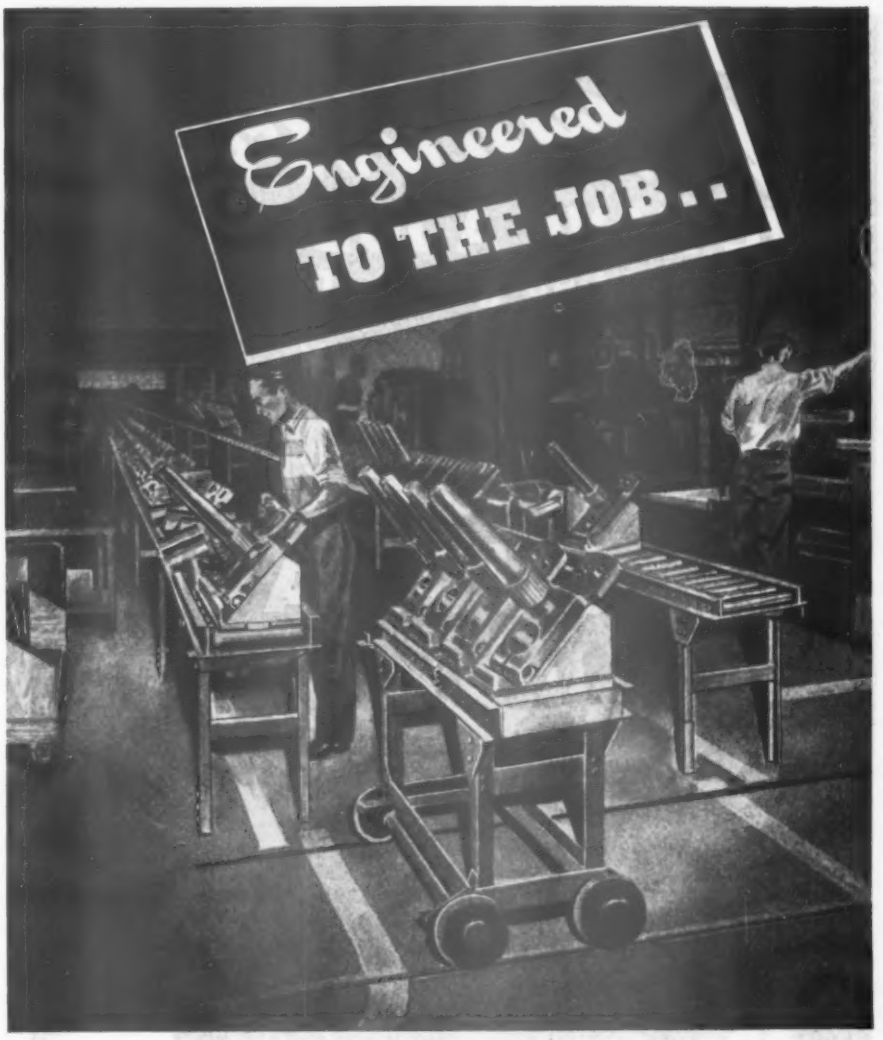
Adventures of Bill

(*Concluded from page* 144)

been discovered, no living person ever has found out why some men smoke curved pipes. In all charity it may be assumed that a man is not necessarily a crook because he smokes a crooked pipe. The nature of flow in bends, curves and elbows has been thoroughly investigated and the results have been plotted in a way you would be surprised, or perhaps a more accurate term—we love accuracy—would be astonished. A copy may be had by addressing an inquiry to the out-patient department, The Nuts Sanitarium, Dipsytown-on-the-Schuylkill (Pronounced Skoogle), Pa., and enclosing a small moiety, pourboir, stipend or honorarium to cover expense of printing, packing and mailing in a plain sealed envelope.

When the fluid passes around a bend in either viscous or turbulent flow, a secondary flow is established in the bend, or more properly described as the sump or area of greatest drip collection. This is a rotating motion, at right angles to the pipe axis and may be a determining factor in the formula designed to show why curved pipe smokers burn so many matches and wear such a dizzy and goofy look.

"The same to you," said Bill, "and many of them. GOOD night!"



Standard Conveyors Synchronize Production All "Along the Line"

WORK in process is quickly shunted from one machine line to the next in this effective Standard Conveyor installation. The transfer table in the foreground consisting of a section of roller conveyor mounted on wheels, provides quick easy means of shifting the work-pieces from one line of roller conveyor to another. Two machine lines are thus continuously fed with work — without halt or interruption and with a minimum of manual handling.

Knowing how to apply power and gravity conveyors to best advantage is equally as important as building them well. An experience record of more than 35 years, serving all classes of industry and business, qualifies Standard Conveyor to be of service to you.

Write for valuable reference book—"Conveyors by Standard" — Catalog No. F-12.

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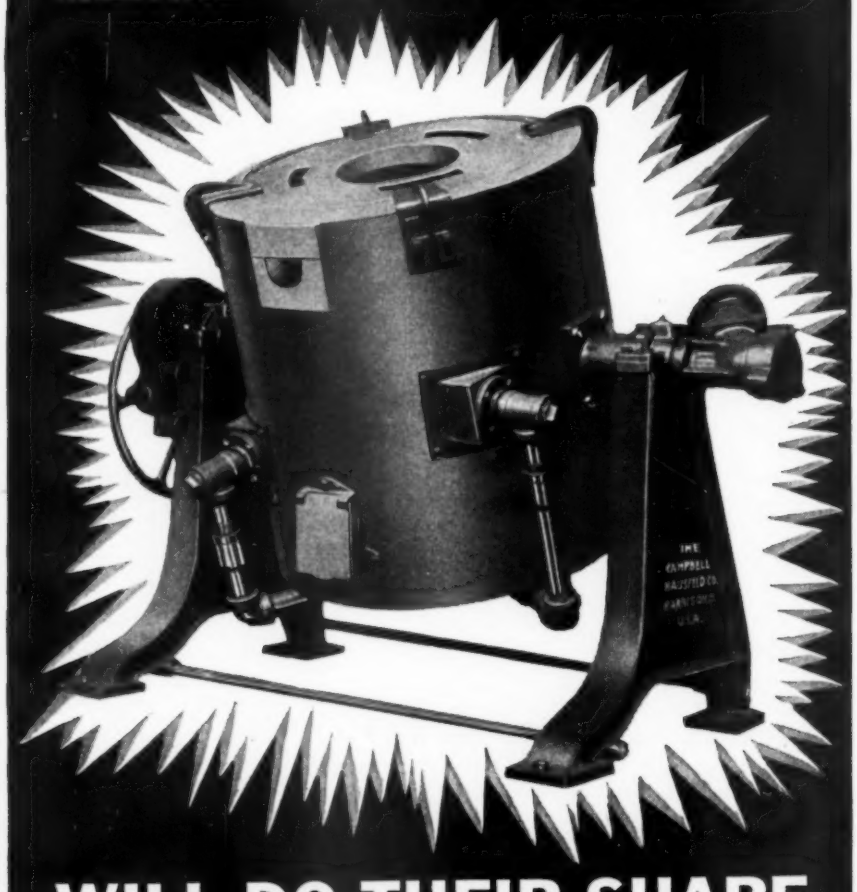
★ ENGINEERED FOR FASTER PRODUCTION ★

Tomorrow
WE HAVE A JOB TO DO
in Rebuilding a War Torn World
HAUSFELD
METAL MELTING FURNACES

WILL DO THEIR SHARE
IN THIS GREAT WORK
FURNACES FOR BRASS, ALUMINUM, MAGNESIUM AND
ALL OTHER NON-FERROUS ALLOYS
The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

CHILLS USED ON BRONZE CASTINGS

(*Continued from page* 109)

intelligently, cost of chill patterns is saved many times over.

While on the subject of chills, reference might be made to various forms of iron oxides employed quite extensively in core sand and core wash mixtures, to prevent *eating in* or *whiskering;* that is, penetration of metal into the cores, particularly where heavy metal sections surround thin cores. Some of the benefit derived from the use of iron oxide is due to the fine grain of this material which closes the openings between the sand grains and thus prevents metal penetration. Beyond any doubt, a great deal of the benefit is due to the fact that the oxide has a chilling effect on the metal coming in contact with it. The first film of metal solidifies before it can penetrate the core. As little as 2 per cent of iron oxide to 98 per cent silica sand will act as a chill. The effect is so marked that distributors of this and other similar materials caution steel foundrymen not to use the material on mold surfaces that form machined faces. The chill might result in machining trouble.

Chills Condense Moisture

Many foundrymen have tried chills and rejected them because they produced blow holes in the castings. A metal chill allowed to stand for some time in a green sand mold will condense a moisture film on the surface. Several methods are available for handling this situation.

In a general way it is desirable to place a chill in position for the metal to lie on it. Only rarely will a chill in the drag part of a mold cause trouble. Chills placed in the cope where the metal rises and comes to rest under them generally are a source of trouble, although there are exceptional cases where this is not true. Chills may be placed on any or all mold surfaces that form the sides of castings.

Use of single chills to cover a large area should be avoided. If a chill 10 inches square is required to take care of a 10-inch square heavy section, much better results will be obtained by the use of four chills each 4 inches square to allow 2 inches of sand between the chills. Still better results would be obtained by using eight or more chills each 2 inches square with sand between them. A chill should be at least as thick as the section in the casting to be chilled and preferably twice as thick. Thickness of the chill will determine the depth of its effect on the grain structure. Effect of a chill on the grain structure easily may be observed by fracturing a casting.

An interesting and simple experi-

mental piece may be made by casting a bar 3 x 3 x 12 inches. Lay a cast iron strip 3 inches wide, 1 inch thick and 6 inches in length on the drag side of the pattern, and then ram the mold in the usual manner and gate it at the unchilled or sand end. The 12-inch casting will be chilled for 6 inches, or one half the length. When this casting is broken into two 6-inch pieces, and then each of these pieces is again broken, the contrast in the appearance of the metal will be so great that no magnification will be required to note the difference. The section that has had the benefit of the chill will show a fracture as dense as a piece of rolled steel. The fracture of the unchilled section will appear actually spongy in comparison.

As the chill used on this bar is only 1-inch thick and the casting is 3 inches thick, the metal probably will be densified to a depth of not more than ¾-inch. Contrast between the structure of the metal that has received the benefit of the chill and that of the metal above it will be so pronounced at first glance that one may suspect that the chilled or lower part of the casting has robbed the tin from the upper part. However, this is not the case. The chilled section does not improve its structure at the expense of the adjoining unchilled section. Drillings taken from the chilled and unchilled sections will show the same chemical analysis.

Chills Solve Problems

Use of chills in sand molds to promote directional cooling and solidification of varying casting sections is one phase of good brass foundry practice that does not require the skilled attention of scientists, metallurgists or chemists. Any skilled practical foundryman is competent to determine which sections in a casting will require a chill, or will benefit by the application of a chill. Results may be determined easily and quickly by fracturing a test casting. Effect of the chill can be seen with the naked eye. No complicated etching, polishing or magnification is needed to bring out the results.

Present scarcity of copper, tin and other nonferrous metals is forcing an increased substitution of other materials for bronze castings. Steel, high grade gray iron, malleable iron and particularly plastics are entering the field and will continue to be used in place of the former brass and bronze. Any practice that will enable the nonferrous foundryman to produce satisfactory castings in competition with substitute materials is of vital importance. By developing the extensive use of chills in sand molds, the foundryman can obtain the benefits of permanent molds and still retain the important flexibility of sand molding. This is one of the factors that will enable him to stay in business after this war is over.

Every employe of the Maytag Co., Newton, Iowa, now is making a regular purchase of war bonds each week through the payroll allotment plan.

BOTTLENECKS

DAMN THE TORPEDOES

FULL SPEED AHEAD!

● Making only Mounted Wheels and small Grinding Wheels—maintaining highest quality in spite of large quantities and rush orders—shipping them promptly—*This is our job, our battlefield.*

With full WPB approval, we stopped making all large size grinding wheels and fixed our sights on wheels *3″ in diameter and under.*

We worked all around the clock, 24 hours a day, and in a short time were able to fill orders on time—And, our central location cuts time in transit. Today, there is no waiting. With the Army-Navy E at our masthead, we are going full speed ahead.

ARMY E NAVY

Half a century of specialization has established our reputation as the Small Wheel People of the Abrasive Industry. You can bank on us.

AMERICA'S HEADQUARTERS FOR MOUNTED WHEELS SMALL GRINDING WHEELS

TEST WHEEL FREE

To get acquainted with Chicago Wheels, let us send one postpaid. Tell us size wheel and material you wish to grind.

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1101 W. Monroe St. Dept. FD, Chicago 7, Ill.

FD-11

Send Catalog. Interested in:

☐ Mounted Wheels ☐ Grinding Wheels

☐ Send Test Wheel. Size _____

Name _____

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Without a Peer!

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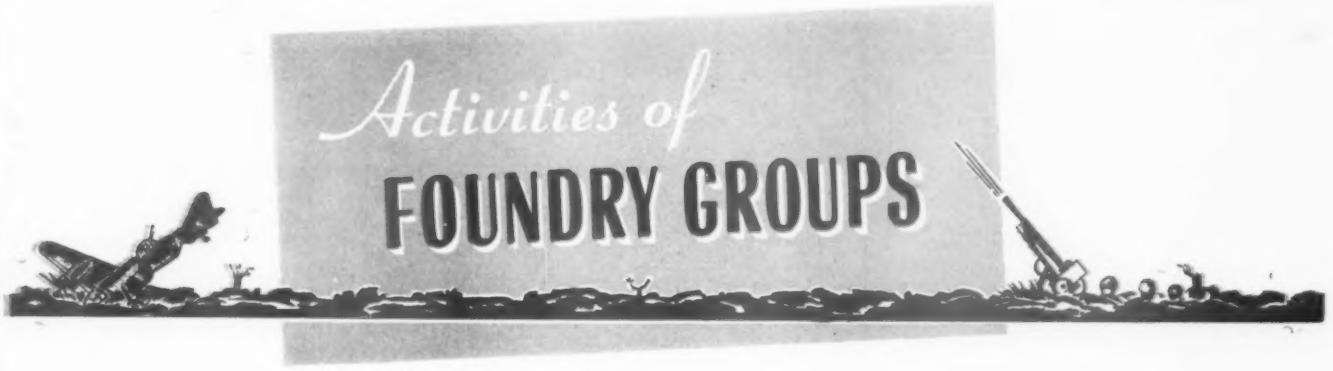


Texas

FIRST steps in formation of a Texas Area Chapter of the American Foundrymen's Association were taken Oct. 29 at a meeting of some 110 A. F. A. members and guests, held at the Rice Hotel, Houston. A petition for admission to full chapter status was presented and approved, and forwarded to association headquarters in Chicago, for consideration by the board of directors of the national society.

A second meeting for formally organizing the new chapter was announced for Nov. 26, in Houston. When finally admitted, the Texas Area Chapter will become the 25th established by the association since 1934.

The October meeting, the first held under A. F. A. auspices in the Southwest, was sponsored by a Texas committee headed by F. M. Wittlinger, Texas Electric Steel Castings Co., Houston. J. O. Klein, Texas Foundries Inc., Lufkin, served as vice chairman, and H. L. Wren, Barada & Page Inc., Houston, as secretary. Other members of the committee were:

A. S. Cramer, Dickson Gun Plant, Houston; L. H. August, Hughes Tool Co., Houston; T. N. Russell, Service Pattern Works, Houston; H. F. Elmer, Dedman Foundry & Machie Co., Houston; W. A. Raymond, Houston Foundry & Machine Co., Houston, and Wm. Bryant Jr., Oil City Brass Works, Beaumont.

Following a "get-acquainted" hour and dinner, Mr. Wittlinger presided and introduced R. E. Kennedy, secretary of the A. F. A., who spoke briefly on the history and national activities of the association, and outlined the procedure of chapter organization. Brief talks on chapter advantages were given by guests from other A. F. A. chapters, including the following:

H. A. Nelson, Hill & Griffith Co., Birmingham, Ala., secretary-treasurer of the Birmingham chapter; John W. Kelin, Federated Metals Division, American Smelting & Refining Co., and L. J. Desparois, Pickands Mather & Co., both directors of the St. Louis chapter; and John H. Spillane, Electro Metallurgical Sales Corp., of the Chicago Chapter.

Speaker of the evening was R. G. McElwee, manager, Foundry Alloy Division, Vanadium Corp. of America, Detroit. Mr. McElwee discussed the work of the Detroit Chapter, of which he is vice-chairman, stressing the value of round-table meetings. The major portion of his talk was devoted to problems of the industry as observed while serving in the Gray Iron section of WPB in Washington. Especially interesting were his comments on trends and difficulties that will face the foundrymen in the postwar period.

Northern California

NORTHERN California Chapter, of A.F.A. held its annual golf party at Orinda Country Club, Oct. 8. A surprisingly large number of men played golf. There were 94 who stayed for the duck dinner and took part in the fun which followed. Golf and horse shoe prizes were confined to war savings stamps and bonds.

Our committee felt that to give only stamps and bonds for door prizes would lack some of the spirit which the occasion engendered, therefore they displayed a great deal of ingenuity in gathering together, at no cost, a quantity of miscellaneous prizes consisting of a shovel for handling the much prized fertilizer for victory gardens; an obsolete plane, an old bicycle pump for testing pressure castings, a chisel, a pair of eye glasses to assist in reading government orders, a few old magazines for foundrymen's waiting room. The grand prize was a piece of plumbing equipment of the days of 1850. All these prizes were awarded after much forethought and with an appropriate speech of presentation to those singled out as recipients.

No money was collected to put the party over; it was self supporting, and yet a profit of $60 was made and the participants were unanimous in pronouncing it the best yet.—*Geo. L. Kennard, secretary.*

Southern California

TWO hundred members of the Southern California Chapter of the A.F.A. availed themselves of the invitation extended by officials of the Fontana Steel Plant of the Kaiser Co. Inc. to visit the plant Sept. 25.

Guests were taken on a complete tour of the steelworks which is the only one of its kind on the West Coast. Among the many units in operation were 90 coke ovens, a sintering plant, four 185-ton open hearths, and a 110-inch plate mill.

After dinner in the modern cafeteria, Chapter President W. F. Haggman introduced several key executives of the Kaiser Co. Rudy Stuler, assistant to the plant manager, Thomas Hart, superintendent of coke ovens, and W. A. Saylor, superintendent of iron and steel production, all of the Kaiser organization, gave talks on the plant history and operation in their respective departments.

While the visit to the Kaiser plant brought the chapter members together in September, the season opened officially with the regular monthly meeting, Oct. 8, at which three speakers were featured.

W. D. Emmett, Los Angeles Steel Casting Co., Los Angeles, discussed "Heading and Gating of Steel Castings"; J. B. Morey, International Nickel Co. Inc., Los Angeles, talked on "Heavy and Medium Gray Iron War Castings"; and H. E. McGowan, H. E. McGowan Co., Los Angeles, spoke on "Brass Alloy in the Foundry and Proper Test Bar Control." A round table discussion, led by different speakers, completed the program.—*Blaine Bender.*

Chicago

FIRST of the series of four round-table meetings for its 1943-44 year was conducted by the Chicago Chapter of the A. F. A. on Nov. 1 at the Chicago Bar Association. Popularity of this type of program was indicated by the heavy attendance, comprised chiefly of operating and plant men.

M. F. Becker, vice president, Whiting Corp., Harvey, Ill., and chapter chairman, presided at the dinner portion of the meeting, and Arthur S. Klopf, vice president and foundry manager, Hansell-Elcock Co., Chicago, chapter vice chairman and program committee chairman, supervised conduct of the round-table discussion.

"Acid Electric Steel" was the subject for the steel division round table, at which L. A. Hahn, Sivyer Steel Casting Co., presided, and W. W. Moore,

Burnside Steel Foundry Co., was discussion leader.

Gray iron division devoted its attention to "Heat Treatment of Castings," with special emphasis on annealing, hardening and stress relieving. Cornell Mate, Greenlee Foundry Co., was chairman, and Charles Walton, Association of Manufacturers of Chilled Car Wheels, was discussion leader.

Nonferrous and pattern divisions combined to consider "Rigging Patterns for Production in the Nonferrous Foundry." H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind., presided, and Edward Sabey, Miehle Printing Press & Mfg. Co., and Chester K. Faunt, Christensen & Olsen Foundry Co., were discussion leaders.

Considerable satisfaction is being derived by the chapter over the enthusiasm which the nonferrous and pattern divisions are maintaining this year. Both were reactivated last year after a period of more or less passiveness. Their attendance at this round table considerably exceeded the turnout of the steel division, which overshadowed the gray iron session by a wide margin.

Discussion of all three round tables was kept on a most practical basis, consisting mostly of questions and answers, and free exchange of experience on routine but nevertheless important phases of foundry operation in all branches.

For its Dec. 4 meeting, the chapter will feature three prominent speakers on the subject of "Inspection of Castings Through Nondestructive Methods." This topic was selected by the program committee because this method of testing is expected to receive greater attention in the future, thus foundrymen should prepare for its wider acceptance and learn how to interpret results.—*Erle F. Ross.*

St. Louis

REGULAR monthly meeting of the St. Louis District Chapter of the A. F. A. was held at the DeSoto Hotel, St. Louis, Oct. 14, and was presided over by Chairman L. A. Kleber. Mr. Hilliard, chairman of the entertainment committee, reported that arrangements for the Christmas banquet are progressing satisfactorily. Mr. Zeis, chairman of the membership committee, introduced four new members who joined since the September meeting.

Chairman Kleber introduced the speaker of the evening, W. G. Conner Jr., general superintendent, Washington Park Works, Walworth Co., St. Clair County, Ill., and chairman, Foreman Training committee, American Foundrymen's Association. Mr. Conner's talk was on "The Foundry Foreman." In his talk Mr. Conner outlined in detail the foreman training course recently completed at the Walworth Co. plant. He also covered some of the work being done by the A. F. A. Foreman Training committee, and the War Manpower Commission.

Mr. Conner introduced Philip Fruedenberg Jr., formerly with the War Manpower Commission and now with the Walworth Co., who described in detail the War Manpower Commission foreman training setup in the St. Louis district.

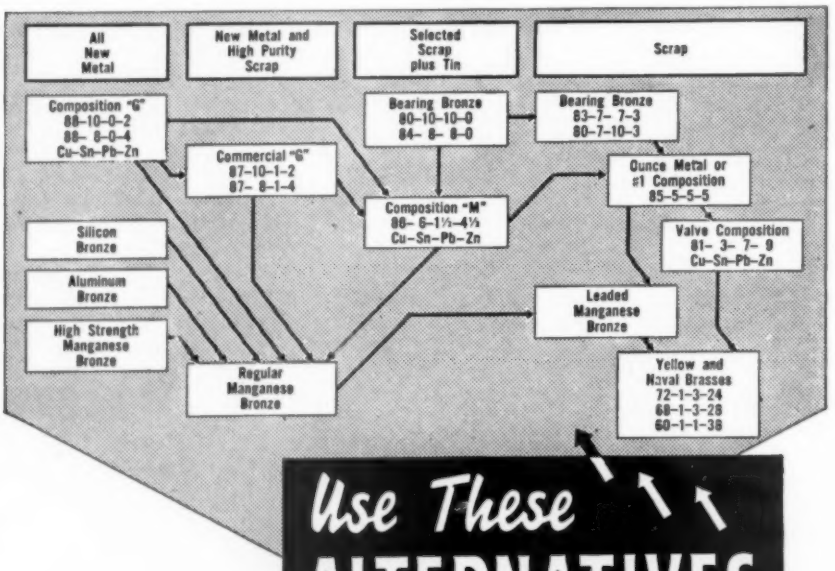
A lively period of discussion followed Mr. Conner's talk.—*J. H. Williamson, secretary-treasurer.*

Cincinnati

CINCINNATI Chapter of the A. F. A. had James A. Murphy, James A. Murphy & Co., Hamilton, O., as its featured speaker at the monthly meeting held at the Cincinnati Club, Oct. 11. Attendance totaled 75, and Vice Chairman William A. Rengering presided.

The subject of Mr. Murphy's talk was "Compressed Air—Its Troubles and Remedies." He first took up the general consideration of air, water vapor, dewpoint, etc., and then pointed out various troubles encountered in compressed air systems because of the presence of water vapor. Methods of eliminating these difficulties were discussed with special emphasis on the proper design and layout of piping systems. Mr. Murphy answered numerous questions after his talk.

It was announced that the fifth annual dinner dance of the chapter would be held at the Netherland Plaza Hotel on Dec. 11.—*Martin F. Milligan, secretary.*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*"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

Notice how the arrows on the W.P.B. chart point to the *right*. . . . They show how alternative materials *currently available* can be utilized by foundrymen as now permitted by many designers. The purpose is to conserve primary metal at the mine through increased use of secondary ingots. Sometimes great ingenuity is called for, yet remember this:

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Twin City

APPROXIMATELY 110 members and guests of the Twin City Chapter of the A.F.A. met at the Midway Club, St. Paul, on Sept. 28, for their regular monthly meeting, which was given over to discussion of foundry wartime problems. Chapter Vice-Chairman Clifford Anderson, presided, and introduced government officials, following whose talks an open panel discussion featured the evening.

Maj. William Moiselle, labor officer, Seventh Service Command, U. S. Army, Minneapolis; Maj. M. C. Walter, assistant to the State Director of Selective Service, Minneapolis; Frank Rarig, regional director of the War Manpower Commission, Minneapolis; and Mr. Rarig's associate, H. Rothschild, all presented pertinent information dealing with phases of the foundry employment problem. Numerous questions were asked by the foundrymen present.

As a result of the discussion, it was decided that the chapter would appoint a committee which would work more closely with the local U. S. Employment Service in an effort to expedite the hiring of foundry workers. Another function of this committee will be to make efforts to combat erroneous publicity concerning the foundry as a place to work. It is hoped that through the work of this committee the problem of replacing lost manpower in the Twin City foundry area may be somewhat relieved.—*Alexis Caswell.*

Central Indiana

REGULAR monthly meeting of the Central Indiana Chapter of the A.F.A. at Hotel Washington, Indianapolis, Nov. 1, had an attendance of about 60 members and guests. Richard Bancroft, chapter chairman, presided. Speaker of the evening was R. A. Bonnell, engineer, Magnaflux Corp., Chicago, who discussed use of zyglo in the inspection of defects in nonmagnetic and magnetic metal.—*Robert Langsenkamp, secretary.*

Pittsburgh

THE first meeting of the year 1943-44 of the Pittsburgh Foundrymen's Association featured a question and answer night with a board of experts composed of members of technical committees of the association. Held on Oct. 25, the meeting saw Ex-President Hays Satterfield, Pittsburgh Steel Foundry Corp., turn over the reins to the incoming president, E. C. Buerkle, National Bearing Metals Corp. Walter White, newly appointed general superintendent of Pittsburgh Steel Foundry Corp., acted as master of ceremonies and chief interrogator. Questions were submitted by members on all phases of foundry practice, including iron, steel, nonferrous and malleable.

Technical committees were composed of W. J. Laird, A. M. Cadman and Otto Nadolny, nonferrous; H. M. Wilson, G. H. Zoerb, H. B. Reed, gray iron; L. J. Kelly and J. J. Curran, malleable; M. J. Kellner, R. C. Heaslett and L. P. Polen, steel.

The entertainment committee announced that the regular Christmas party will be held at Hotel William Penn, Monday evening, Dec. 20.—*R. L. Hartford.*

Western Michigan

FINE steak dinners were enjoyed by 68 members and guests at the initial meeting of the season for the Western Michigan Chapter of the A. F. A. on Oct. 11, at the Ferry Hotel, Grand Haven, Mich.

Dr. George P. Halliwell, research director of Kramer & Co., Chicago, gave a very timely and informative lecture on "The Physical Metallurgy of Aluminum Bronze and Manganese Bronze and Their Application to War Work." Dr. Halliwell discussed the effects on the microstructure and physical properties of varying amounts of copper, zinc, nickel, manganese, aluminum, iron and lead. He illustrated his lecture with slides. A general discussion followed.

Following the lecture a movie, "The Panorama of Alloys in Steel," was shown

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to the group through the courtesy of Climax Molybdenum Co.—*C. H. Cousineau, secretary.*

Quad-City

QUAD-CITY Chapter of the A.F.A. met at Fort Armstrong Hotel, Rock Island, Ill., Oct. 18 for discussion of "Foundry Coke, a Raw Material and a Fuel." Sixty-five members were present for the dinner and discussion.

B. P. Mulcahy, Citizen's Gas and Coke Utility, Indianapolis, was the featured speaker. He gave a description of coke manufacturing, crushing and screening, with a resume of physical and chemical properties. It was pointed out that the current specifications for coke were compiled in 1916, and are in need of revision to bring them up to date. In the speaker's opinion, a coke ratio of 6 to 1 or 8 to 1 is most advantageous.

Mr. Mulcahy pointed out that the cupola well is not a source of carbon dissolving to the extent generally believed. It was his thought that the size of the coke had more effect on the carbon content of the iron. In conclusion, Mr. Mulcahy gave his three rules which assure good melting practice: 1.—Know your cupola. 2.—Use the cupola information available, along with good common sense. 3.—Use first class melting material.

Rod Hogren, local magician gave an excellent half-hour program of mystifying feats at the conclusion of the technical discussion.—*H. L. Creps, secretary-treasurer.*

Ontario

DISCUSSION at the opening meeting of the Ontario Chapter of the A.F.A. for the 1943-44 season was devoted to the subject "Collective Bargaining." Its various phases were analyzed thoroughly by D. B. Chant, Ontario Pulp and Paper Makers' Safety Association, Toronto, at the meeting held at the Royal Connaught Hotel, Hamilton, Sept. 24 before an audience of about 100.

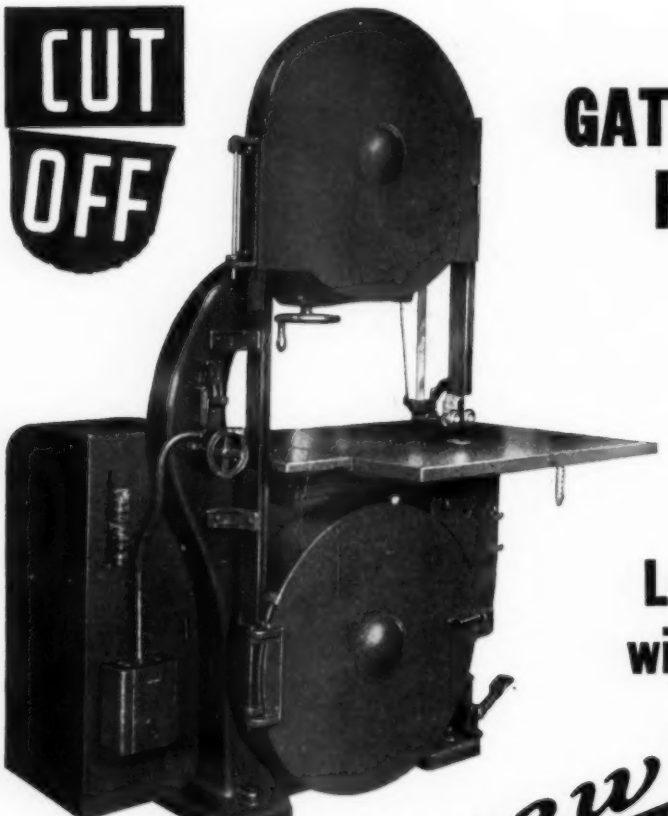
Mr. Chant indicated that the labor movement in Canada is approximately 110 years old. The year 1850 marked the first entrance of an outside union into Canada, and the Trades and Labour Congress of Canada was organized in 1886. It is the industrial situation itself rather than the war which has produced the widespread and intensive growth in union activity in Canada since 1939, according to the speaker. Organization of labor in Canada is probably not more than 25 per cent complete, but if the recent rate of development continues it may be expected to reach perhaps 50 per cent in another couple of years.

In considering the meaning of collective bargaining, it should be noted that while theoretically there may be nothing to make it necessary that one of the parties to the process should be a labor union or a group of unions, practical considerations make it very difficult for collective bargaining to operate unless the labor group is organized in the accepted sense of the word, Mr. Chant stated. To bargain at all in the true sense, both parties must possess the power to bargain and the right to bargain.

According to Mr. Chant, collective bargaining may then be defined as "bargaining with respect to wages, hours, conditions of work, and similar matters, where one or more of the bargaining parties represent and act for a group of individuals, all of whom are to be bound by the resulting bargain and where both parties possess the right to bargain on behalf of those they represent and are free to exercise that right" the speaker outlined federal government policy with respect to collective bargaining and discussed in some detail a typical collective bargaining agreement.

In conclusion, he pointed out that one should always try to keep firmly in mind, in connection with industrial relation problems, that there is no essential difference between the individuals making up the two groups called "labor" and "management." Neither one group nor the other has a corner on good nature, honesty, or fairmindedness, or stubbornness either.

Chapter Chairman C. C. MacDonald, Frederic B. Stevens of Canada Ltd., was



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in the chair, turning over the introduction of the speaker and the leadership of the discussion to the technical chairman, Theo Tafel Jr., Standard Sanitary & Dominion Radiator Ltd.—*G. L. White, secretary-treasurer.*

E. Canada - Newfoundland

FURTHER evidence of the popularity of the quiz type of program among the Eastern Canada and Newfoundland Chapter of the A. F. A. was forthcoming at the meeting held in the Mount Royal Hotel, Montreal, Oct. 15. An audience of 119 members and guests participated.

Six discussion leaders answered a series of questions distributed by the technical chairman who, for this occasion, was Bernard Collitt, metallurgical director, Jenkin Bros. Ltd., Montreal. Almost every question and answer produced a lively exchange of opinions and supplementary suggestions from the audience, and several questions remained unanswered when the chairman found it necessary to halt the program because of the lateness of the hour.

Twelve new members were introduced at the meeting, bringing the membership to 215.

Chapter Chairman Delahunt reported promising progress in the apprentice educational program. However, he emphasized the necessity for the foundry industry to take steps toward interesting and informing young men regarding the importance and potentialities of the foundry industry, to the end that other branches of engineering should not have an uncontested field in securing the attention of young men coming out of our schools and colleges.—*A. E. Cartwright.*

Northeastern Ohio

A GLIMPSE into the postwar market for aluminum castings was provided in a talk by L. W. Kempf, Aluminum Co. of America, before more than 150 members and guests of the Northeastern Ohio Chapter of the A.F.A. at the monthly meeting held at the Cleveland Club, Oct. 14. B. D. Nicola, United States Commissioner at Cleveland, provided the "coffee talk" and related numerous interesting experiences of his profession.

Mr. Kempf, associated with the research division of the Aluminum Research Laboratories, Cleveland, pointed out that the rapid expansion in aluminum producing capacity in recent years to an eventual annual rate of 2,100,000,000 pounds of ingots will have an important effect on the entire industry. He estimated that after the war there will be a return to the market each month of between 20 and 50 million pounds of secondary aluminum and that this volume will permit the use, among various applications, of up to 200 pounds of aluminum castings per car in automobile production.

The prospect for lower postwar prices on primary aluminum indicates the possibility that secondary ingot prices will put aluminum castings in a position to offer considerably greater competition with gray iron than has been true in the past, according to the speaker. He added, however, that production costs in making aluminum castings must be reduced if the product is to be truly competitive with gray iron. The most excessive item in aluminum foundry costs is the low yield resulting from the use of large gates and risers, and Mr. Kempf suggested that the engineering designer and foundryman co-operate in an effort to curtail the need for such gates and risers, and thereby reduce costs of aluminum foundry operation.

No marked changes in the chemical specifications of aluminum castings to be used in the postwar market are looked for, Mr. Kempf stated. Mechanical properties can be regulated by heat treatment which will provide up to 35,000 pounds tensile strength with 2 per cent elongation, while 3 per cent elongation can be obtained through annealing with an accompanying tensile value of 25,000 pounds.

Mr. Kempf said he saw possibilities of greater use of semipermanent molds in the casting of aluminum, but he looks for only limited application of plaster molds.—*W. G. Gude.*

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Metropolitan

THE first meeting of the 1943-44 season for the Metropolitan Chapter of the A.F.A., was held at the Essex House, Newark, N. J., Oct. 4, with T. D. Parker, vice-chairman, presiding. This meeting was devoted to gating and risering practices involving the various metals, and was divided into four different groups, as follows:

Steel castings—discussion leader, Karl V. Wheeler, vice-president, American Steel Castings Co., Newark; gray iron—Discussion leader, H. C. Harris, foundry metallurgist, Mack Mfg. Corp., New Brunswick, N. J.; brass and bronze—discussion leader, Wm. E. Paulson, president, Thos. Paulson & Son Inc., Brooklyn, N. Y.; aluminum and magnesium—discussion leader, R. E. Ward, Eclipse-Pioneer Division of Bendix Aviation Corp., Teterboro, N. J., assisted by A. McIntosh, Wright Aeronautical Corp., Paterson, N. J.

It was interesting to note the close attention of the groups to their leaders during the opening address, and the numerous questions submitted thereafter. Attendance of over 100 foundrymen substantiated the committee's belief that opening the season with a divisional conference meeting would meet with their approval.

At the second meeting of the season, on Nov. 1, J. W. Reid, chairman of the Metropolitan Chapter, had the pleasure of introducing the national A.F.A. president, Lee C. Wilson, Reading Steel Casting Division, American Chain & Cable Co., Reading, Pa. Mr. Wilson outlined the various activities of the home office and stated that it is at all times ready to assist any chapter, promptly and efficiently.

Another guest, Harry Reitinger, Bethlehem Steel Co., Bethlehem, Pa., and National director, A.F.A., addressed the group as a member of the Chapter Contact committee of the national body. He stressed the benefits derived from the various regional and group meetings.

The technical speaker of the evening was John N. Ludwig Jr., metallurgist, Electro Metallurgical Corp., New York, who presented an illustrated talk on "Metallurgical Control in the Foundry." Russell J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J., and National director, A.F.A., presided as technical chairman.—*Henry C. Seidel.*

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Western New York

REGULAR monthly meeting of the Western New York Chapter of the A. F. A., held at Hotel Touraine, Buffalo, Nov. 5, had Harry W. Dietert, Detroit, as its principal speaker. Frank E. Bates, chapter chairman, who presided announced that M. T. Ganzauge, General Railway Signal Co., Rochester, had been appointed a director to serve the unexpired term of E. P. Meade, who has left the foundry industry and is no longer a member of the association.

James L. Yates reported on the committee meeting held Oct. 5 to formulate plans for another war production conference of all industries to be held in December. He stated that plans have been made to have a well-known speaker address the conference, after which the war problems committee will take over the foundry group to answer questions regarding operations, etc.

R. D. Loesch, program chairman, reported on the program for the balance of the season, and H. K. Rose, membership chairman, reported 30 new members had been obtained since the start of the 1943-44 season.

Chairman Bates introduced V. L. Whitehead Jr., Whitehead Bros. Co., as technical chairman for the evening, and the latter in turn introduced Mr. Dietert. The title of Mr. Dietert's talk was "The Behavior of Molding Sand and Cores at Elevated Temperatures" and was illustrated by a colored movie, which shows the action of various sand mixes at pouring temperatures and corrective measures when the sand does not stand up. High temperature testing includes expansion, hot shrinkage, spalling, hot strength, hot deformation, hot permeability, heat conductivity, retained strength and gas. All

sand grows, while clay contracts, it was pointed out. To retard disintegration of cores it is recommended to use fine sand, sand with clay substance, or 1 to 2 per cent iron oxide. With the addition of molding sand, the clay takes hold after the other elements have burned out, while use of silica flour will give the strongest core at elevated temperatures. The retained strength determines the ease or difficulty of shakeout.

T. E. Barlow, Vanadium Corp. of America, New York, is scheduled to address the Western New York Chapter on the subject of "Ladle Inoculations" at the next meeting, Dec. 3.—*J. Ralph Turner, secretary.*

Philadelphia

OPENING meeting of the 1934-44 season for the Philadelphia Chapter of the A.F.A. was held at the Engineers Club, Oct. 8. Attendance of 125 members and guests was a good start in bettering the record of chapter last year, when it had the best attendance record throughout the season of all chapters.

The after-dinner speaker, G. T. Eager of the *Evening Bulletin*, who is a member of the Committee for Economic Development of Philadelphia county, gave an interesting discussion on plans of this committee for the postwar period.

The technical talk was given by D. Basch, consultant on materials and processes for General Electric Co., his subject being "Future of Magnesium Castings". So much interest was shown by the members in the subject, that they kept Mr. Basch busy answering questions for more than 2 hours after the conclusion of his talk. — *William S. Thomas, publicity chairman.*

New England

MONTHLY meeting of the New England Foundrymen's Association was held at the Engineers' Club, Boston, on Oct. 13, with more than one hundred members and guests attending. The speaker was Emile Pragoff Jr., naval stores department Hercules Powder Co., Wilmington, Del., who discussed "Core Making—In Theory and in Practice."

The speaker illustrated his talk throughout and showed many practical slides on the theory of obtaining a good core sand for various types of jobs. He explained that the first requisite in core baking is to remove the moisture from the core. After that a wide range in baking characteristics is found depending on the type of core binder used. Cereal bonded cores give maximum dry compression strength when baked at 350 degrees Fahr. and lose strength rapidly when the temperature is increased above that point. Resin bonded cores reach their maximum dry compression strength at 475 degrees, and pitch bonded cores reach a high dry compression strength at 550 degrees and increase in strength when the temperature is carried still higher. When reclaimed sand is used, however, resin bonded cores obtain maximum dry compression strength at 300 to 400 degrees and drop in strength when that temperature is exceeded.

Different binders vary in the amount of gas evolved from the core, and it is always advisable to consult the supplier as to the gas content to be obtained for each product. When two binders are used, one often helps the other and the resulting properties may excel those obtained when either material is used alone.

Although strength tests carried out in the laboratory are a necessary guide in making up core sand mixes, it is likewise necessary to study the results in the foundry in order to prove the effect of various core binders on the cores produced.

The regular monthly meeting of the New England Foundrymen's Association on Nov. 10 had an attendance of approximately 80 members and guests. Speaker of the evening was Nathan C. Harrison who discussed the subject "Heat-Treated Steel Shot and Heat-Treated Steel Grit." Mr. Harrison was owner for 38 years of the Harrison Supply Co., Boston, and for 7 years president of the International Abrasive Corp., with three plants in Canada and four in the United States,

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manufacturing abrasives such as silicon carbide and artificial corundum.

At Mr. Harrison's plant at Manchester, N. H., production is now about 10 tons of shot per hour. At this plant the iron is melted in a cupola, and a jet of steam separates the stream as it comes from the cupola and falls into the water. Mills of the ball type are used to grind the shot into grit. Although it is commonly spoken of as steel shot the material is really of a cast iron composition.

Mr. Harrison explained the advantages of the use of shot from the standpoints of economy, efficiency, and safety to the operator. He also told of the disadvantage of the dust formed from sand which is not obtained where shot is used, and stated that blast nozzles wear out faster when sand is used than when shot is employed. Grit is used extensively for cleaning nonferrous castings.—*Merton A. Hosmer.*

New Jersey

WAR LABOR BOARD policy on wage stabilization, particularly as applied to wage rates in the northern New Jersey foundries, was discussed by T. W. Kheel, at the New Jersey Foundrymen's Association meeting at the Downtown Club, Newark, N. J., Oct. 25, attended by more than 100 members and guests. Mr. Kheel is chairman of the War Labor Board for the region comprising New York state and northern New Jersey.

His remarks held special interest as the board recently had prepared a tentative schedule of "going wage rates" for the local foundries which was somewhat higher than the current prevailing wage rates. This schedule had not yet been published and the association was protesting it as not being correct for the area.

Mr. Kheel said that the rates would not be mandatory but would be used as a guide for decisions on any applications for higher wage rates which might come before the board. He explained how the rates had been arrived at from surveys of actual current rates in local foundries, but said that they were only tentative and that his purpose in attending the meeting was to explain the policy of the board and hear the views of members of the association. W. B. Turner, Walker-Turner Co., Plainfield, N. J., and Frank J. Hammel, Western Electric Co., Kearny, N. J., industry members of the regional labor board, were guests, and participated freely in the general discussion.

John L. Carter, cost consultant, Gray Iron Founders' Society, explained briefly the latest amendment (No. 6) to OPA Regulation 244 (Gray Iron Castings). It provided, he said, special procedure for a foundry to apply for permission to add overtime premium costs to base period prices. The amendment was a disappointment, since the industry had requested that such permission should be granted to all foundries without requiring a special application in order to obtain it. Mr. Carter expressed the opinion that, in most cases, a foundry needing relief would find it better policy to apply under Amendment 3, since relief so granted would be permanent, whereas relief granted under Amendment 6 would diminish to zero if overtime should be discontinued.

The following directors were re-elected for the usual three-year term: Walter H. Cole, Moore Bros. Co., Elizabeth, N. J.; G. W. Hannay, Barnett Foundry & Machine Co., Irvington, N. J.; William H. Mantz, Atlas Foundry Co., Irvington, N. J.; David L. Sacks, Sacks-Barlow Foundries Inc., Newark; H. A. Vreeland, North Jersey Foundry Co., Little Falls, N. J. Also elected were E. B. Smith, American Brake Shoe Co., New York, who will succeed H. Reitinger, United States Pipe & Foundry Co., Burlington, N. J., and H. F. O'Brien, A. P. Smith Mfg. Co., East Orange, N. J., to fill another vacancy on the board.—*B. K. Price.*

Milwaukee Chills have passed the rigid inspection of foundrymen who demand the best. These Chills have been improved to accelerate cooling, insuring sound castings free from internal shrinks and surface checks. They will also prevent molten metal from cutting into the sand. These Chills will cut scrap losses, and reduce welding and cleaning costs.

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Pangborn Again Wins "E" Award

Pangborn Corp., Hagerstown, Md., has been advised by the Secretary of War that it has won the Army-Navy "E" award for the second time, adding a white star to the pennant it received originally last spring.

SOUND COSTING ESSENTIAL FOR PROSPERITY

(*Continued from page* 103)

To cite another example, when the old Newark Uniform Cost Group was started in 1927, it was discovered for the first time that the overhead on floor work was much higher than the overhead on bench work. Because the group members had been using one flat overhead for both floor and bench work, it was found that no one was making any actual profit on floor work. As soon as this became known, floor work prices started to go up, and 2 years later all were making money on floor work. This improvement in profit was due solely to a more accurate knowledge of costs.

To cite one more example, a foundry in Newark had a reputation for making the best castings in the district and enjoyed quite a large business. But it was old-fashioned and would not bother with a cost system. It finally went into receivership and closed up. What happened to a large part of its business could be traced. In practically every case customers paid from ½-cent to 2 cents less per pound than they did to other foundries. The foundry which closed could just as well have obtained the higher prices for its quality was so high that it probably could have gotten higher prices than its competitors, *if it had known its costs.*

Price Cutting Is Menace

The second point stated that an increase in price by a price cutter will enable several competitors to get a better price for their product, and will therefore frequently lead to a price increase on a volume of business much larger than the price cutter's volume. In many local markets—perhaps in all local markets—the general level of prices is held down by the low prices quoted by one or two local price cutters who do not know their costs. Consider a local market having three foundries, doing a total business of one million dollars, which have sound costs, and one foundry, doing a business of only $200,000, which quotes ridiculous prices because it has no cost system. This price cutter gets only $200,000 of business, but he has a capacity of $300,000 and he may quote lower prices than the other foundries on $600,000. If those other foundrymen were good business men, they would know that the price cutter could not handle much more business and would refuse to cut their prices to meet his competition. But what happens? If an important customer confronts one of them with a price cut of 1 cent, it compromises by cutting its price ½-cent. In this way, although the price cutter's actual volume is only $200,000, he may force a price reduction on $600,000 done by his local competitors. This is a very common situation.

One rotten apple in a barrel can spoil the whole barrel, and one price cutter in a local market can spoil the whole market. One of the most effective things that can be done to improve profits is somehow to induce the price cutters to adopt a good cost system. Sit down some day and figure out how much the price cuts you make to meet competition amount to in dollars and cents. In most foundries doing a business of $500,000, this would total at least $25,000. Then try to figure out some other way of saving $25,000, and how much of your time this would require. When you compare the two methods, the conclusion must be reached that a few hours spent in organizing a local cost meeting or in friendly talks with other foundrymen about the cost service available to the gray iron industry would be likely to bring greater tangible benefits than the same amount of time spent in any other manner.

The third point was that the adoption of a good cost system by any foundry would lead to a reduction in costs in that foundry. A good cost system provides the management with two important aids to cost reduction—job costs, and monthly cost reports. When a foundry has no job costs, it frequently continues to make certain jobs at a loss for years, either because it does not realize that it is los-

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ing jobs or because it does not realize the extent of the loss. But when for the first time accurate job costs are obtained on a losing job, the first step, before advancing the price, is—or should be—to try to reduce the cost by better methods, better pattern equipment, or perhaps a change in design. When the management's attention is really focused on a losing job, it is surprising how often some way can be found to reduce the cost so as to make a profit at the old price. That is constructive—that is pure gain for the foundry and for the industry. By a succession of such job cost reductions the industry becomes better able to meet competition from other materials.

A similar improvement in efficiency results from general cost control through properly designed monthly cost reports. A cost system has two separate and distinct functions. One is the determination of job costs; the other is cost control. A cost system which is adequate for the determination of correct job costs is not necessarily adequate for the purpose of cost control, unless it has been designed with that purpose in mind. There are hundreds of foundries which have a fairly accurate cost formula but which do not have, or do not know how to use, properly designed monthly cost reports whereby they can establish standards of performance and systematically spot variations from standard, locate the cause, and proceed to find a remedy.

As a further step in improving the efficiency of the industry, there is nothing which would be effective more than a general use of cost comparisons with other foundries. A comparison of your costs with your own best past performance is very helpful, but your best may not be good enough, and usually you cannot determine when your best is still too high until you have an opportunity to compare your principal items of cost with those of other foundries. Knowledge gained in this way provides a powerful incentive to get that high cost item down, because you know that *it can be done.*

The last point was that the adoption of a sound cost system by certain marginal foundries would show the management the extent of their losses and hasten the day when they would either shut down or change over to the production of some other product than gray iron castings. This applies particularly to the foundry department of manufacturing plants. I have had occasion recently to advise several manufacturing companies to treat the foundry as a separate business on their books and get a separate profit and loss statement on its operations. If more manufacturing companies would do this, they would ultimately decide to shut down their foundries and buy their castings outside.

Adapt Foundry to Changes

The future profit level of the industry will depend to some extent on its ability to adapt itself to changing demand. When capacity exceeds demand, it is desirable that some producers should drop gray iron and manufacture another product. Sound cost accounting will stimulate such changes. Normally there are a great many gray iron foundries which continue to operate year after year at a loss—sometimes with frequent changes in management or ownership. Most of these foundries have no cost system. If more of them had sound cost systems, they would be more likely either to learn how to operate at a profit, or to drop gray iron and go into some other line of business.

To sum up, four ways have been shown in which the more general use of sound cost methods would improve the average profit margin of the industry. Prices on a large volume of business, now sold below cost by price cutters, would increase; this would bring about an increase in price on a much larger volume of business because of the removal of cutprice competition; average profit also would be increased by reduction of costs in all foundries adopting a sound cost system; and average profit would be favorably affected by the stimulation of the conversion of some gray iron capacity to other products where this is shown by good cost records to be economically desirable.

A combination of the three factors easily could bring about an increase in price of 2 per cent or ⅛-cent, and a decrease in cost of 2 per cent or ⅛-cent,

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The Detroit Rocking Electric Furnace was developed during the first World War to provide a rapid means of melting brass and bronze with minimum labor and lowest metal losses. Since then its use has expanded to include the melting of gray irons, white iron, Niresist, Nihard, stainless and other special high alloy steels, nickel, Monel metal and other special alloys both ferrous and non-ferrous. Versatile, flexibie, fast and efficient, Detroit Furnaces insure highest quality metallurgical results with maximum economy. Write for complete facts.
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and the total gain of 4 per cent on an annual volume of $750,000,000 would amount to $30,000,000. This estimate is conservative. Of course, this improvement could only be brought about gradually over a reasonable period of time. But it is certainly a goal worth striving for, and it indicates that the cost program should be considered one of the society's most important activities and should be pushed energetically in order tc reach this goal in the shortest possible time.

Apart from special wartime activities, which are absorbing most of our attention today, our principal constructive activities are sales promotion, engineering service, and cost promotion. I am delighted that the society has now under way effective and expanding programs and sales promotion, and engineering service. But it should be pointed out that neither sales promotion nor improvements in engineering efficiency can bring about a fair level of profits unless we can improve the general level of cost accounting practice and business management. Poor cost accounting is the rotten apple that spoils the whole barrel; it is a contagious disease which infects the entire industry; it paralyzes the business judgment of sellers of castings.

Long Range Program

These arguments apply to normal times, and remember, this cost program is a long range program. Its effects will be cumulative—once a foundryman has been converted to sound cost accounting he will never go back. But under present abnormal conditions, sound cost accounting has many special advantages over and above its value in normal times. Consider first its value under price control. Those foundries which had a sound cost and pricing policy on Feb. 1, 1942, have benefited greatly from this policy, and those which did not have been at a distinct disadvantage. This disadvantage might amount to as much as 1 cent per pound in the level of their maximum prices,. even though their actual costs were identical. This difference could result from the following differences in cost and pricing practice on Feb. 1, 1942:

1. All costs, including all legitimate charges to reserve accounts, included in cost.
2. Overhead based on normal volume instead of actual volume.
3. Use of more accurate cost methods, such as direct cleaning costs, or separate overheads on floor, bench and squeezer work.
4. A policy of quoting fair prices instead of cut prices.

All the bad practices of the price cutters and those which had no costs or inaccurate costs were frozen by MPR 244, and those guilty of such foolish practices were doomed—with some justification—to be bound and handicapped by them in the face of continually increasing costs and adverse conditions. Of course, such rigid price control came rather suddenly—but it seems that it could have been foreseen by any intelligent foundryman far enough in advance of February, 1942, to put his house in order and adopt a good cost system and pricing policy before the lightning struck. This certainly should be a warning to those who even today have not adopted a sound cost system. It is one illustration of the fact that a foundry with a sound cost system is armed and equipped to meet any emergency, whereas a foundry without a sound cost system may at any time find that its lack is a far more serious handicap than it had anticipated.

A sound cost system has many other special advantages under price control. One of the most important interpretations that has been issued states that, where there has been a substantial change in the character of the work ordered at a frozen flat price, this may be changed to individual formula maximum prices or to a flat price subject to adjustment based on an average of individual formula maximum prices. This provision can be taken advantage of only by a foundry which has a good cost system. It is probable that many foundries, which, for lack of an adequate cost system would be quite unable to calculate costs and prices in this manner, are losing thousands of dollars today from failure to take advantage of this provision.

A sound cost system is also a most important factor in securing relief

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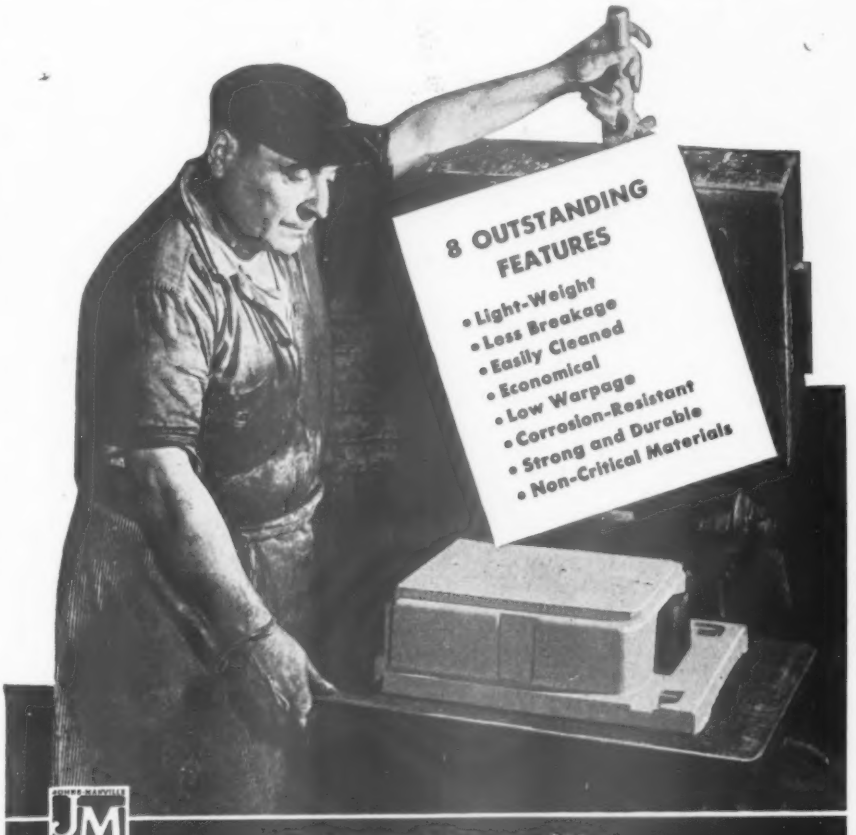

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through an application for adjustment. A foundry without a cost system would find it difficult, and in some cases almost impossible, to secure relief on many jobs on which it might clearly be entitled to relief if it could prove its actual job cost by the use of cost methods with some recognized standing, such as our standard cost system.

Maximum Price Regulation No. 244 unquestionably has exerted a strong influence on gray iron foundries to induce them to improve their cost methods. This is, therefore, a most appropriate time for the society to launch a campaign for the promotion of sound cost accounting. There is another phase of government control in which cost accounting plays an important part. That is renegotiation. It has only recently become a serious problem in this industry, but a considerable proportion of our foundries are likely to be affected by it sooner or later. To show the importance of the use of recognized cost methods, I quote from an article on renegotiation by a member of one of the Army price adjustment boards:

"In every case, it is extremely important that the contractor submit a statement expressing in detail the methods used in segregating costs and expenses. Whatever method is used, the accountant for the board must consider carefully and pass upon the basis of segregation, which must be in accordance with generally accepted accounting practices and procedures." In the gray iron foundry industry, the methods which have obtained the widest recognition in the industry are those included in the society's standard cost system.

Sound cost methods are also valuable in connection with applications for relief from excess profit taxes under Section 722 and in connection with adjustments on war contracts cancelled at the end of the war.

I am not concerned about the long-range prospects of the gray iron foundry industry, for gray iron is a staple engineering material which will always be needed in large volume. But I am somewhat concerned about the immediate future, for there are several adverse conditions to be faced. From 30 to 40 per cent of the industry's output went into machine tools during 1942, and this demand will be reduced greatly during the rest of the war period. Its revival after the war may be very slow. There seems no likelihood of filling this gap until the end of the war releases the pent-up demand for our civilian products. We will then have to meet new competition from other products in which technological improvements during the war period have been rapid. It seems probable, therefore that for the rest of the war period, and perhaps for some time thereafter, competition within the industry will be keen. If we are entering a period of keen competition, profits are likely to fall, and there is danger that this fall will be accelerated by a foolish scramble for business and resort to price cutting. Extent to which the industry suffers from this practice will depend principally on the extent to which sound cost practices prevail in the industry.

May Continue Price Control

Furthermore, there is a definite possibility that price control may be continued for a limited period after the war, but that instead of establishing ceilings over prices, the government agency may establish floors under prices, somewhat in the manner attempted by NRA. By discussing this matter, I am treading on dangerous ground, for there may be wide differences of opinion within the industry in regard to such a policy. But in any case, if minimum price control after war is a possibility, we must face it, and we should not be caught unprepared. It is my personal opinion that some industries, which were properly prepared to take advantage of it, got substantial benefits, directly or indirectly, from the price control features of NRA. Industries which benefited most were those which had had the strongest trade associations and in which the trade association had induced the largest proportion of the industry to adopt sound and uniform cost accounting methods. Prevalence of sound cost methods usually had been achieved by an effective program of cost promotion carried on by the trade association. If the gray iron foundry industry is to be

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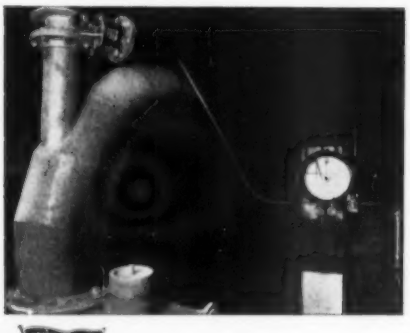

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AIR-WEIGHT CONTROLLERS

prepared to take advantage of and benefit from a program of minimum price control after the war, we should push our cost program as vigorously as possible at this time.

A talk presented at the annual meeting of the Gray Iron Founders' Society at Cincinnati, Oct. 6. The society recently announced a new cost consulting service which is available to all gray iron foundries. Information regarding this service may be obtained from Mr. Carter, 120 Branford Place, Newark 2, N. J.

THE EDITORS.

Modify Many Steel Specifications

Since its inception in September, 1941, the WPB National Emergency Steel Specifications project has been engaged actively in selecting the minimum number of specifications, compositions, and sections of steel mill products necessary for the war emergency, in order to increase production with existing facilities.

This project originally was established by Donald M. Nelson, in his then capacity of director, division of purchases, OPM, as an aid to the iron and steel section of that agency, which later became the Steel Division, WPB. Three national agencies—the American Iron and Steel Institute, Society of Automotive Engineers, and the American Society for Testing Materials—were asked to direct this work in collaboration with the War and Navy Departments. C. L. Warwick was named administrator of the project, and chairman of the administrative committee, which is composed of representatives of the five organizations named previously. Edwin Joyce was appointed assistant administrator.

The administrative committee is assisted in the highly technical phases of its work by 12 Technical Advisory Committees, appointed by the administrator and in all composed of 136 representatives of producing interests, 211 representatives of consuming interests, and 31 representatives of various federal agencies. Representatives of Great Britain and Canada meet with the technical advisory committees and the administrative committee as liaison consultants. These Technical Advisory Committees serve as the meeting ground for representatives of all important steel producers and all agencies having cognizance over specifications for steel mill products.

The NE steel specifications accomplishments in a very large measure have been achieved by co-operative action on the part of sponsor agencies in modifying existing specifications at the request of the Technical Advisory Committees. By these modifications the specifications have been made less restrictive or the requirements have been co-ordinated with those of similar specifications. Of the 250 odd specifications selected by the various TACs, exclusive of aircraft steel specifications, aproximately one-half have been modified either by revision or by the issuance of emergency amendments. These same sponsor agencies similarly have issued 12 new specifications covering products purchased previously on private consumer specifications only. A list of new and amended specifications issued on the recommendations of the TACs of particular interest to the foundry field follows:

They are American Society of Mechanical Engineers specifications ASME-S-11, carbon steel castings; ASME-S-33, alloy steel castings for pressure vessels and pressure piping for high temperature service; ASME-S-56, carbon steel castings for fusion welding; ASME-S-57, alloy steel castings for fusion welding for high temperature service, and ASME-SA-95, carbon steel castings for high temperature service.

American Society for Testing Materials specifications ASTM-A27-42, carbon steel castings; ASTM-A87-42, carbon and alloy steel castings; ASTM-A95-41, carbon steel castings for high temperature service; ASTM-A157-42, alloy steel castings for pressure vessels and pressure piping for high temperature service; ASTM-A215-41, carbon steel castings for fusion welding; ASTM-A216-42T, carbon steel castings for fusion welding for service up to 850 degrees Fahr., and ASTM-217-42T, alloy steel castings for fusion welding for high temperature service.

Need for much of the work done in the NE steel specification program existed prior to the war, but has been

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1 *Mogul* – the perfect green and facing bond.

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Pitch or Resin – because cores can be handled while still warm.

4 *Mogul* – because sharp sand can be widely used.

5 *Mogul* – because smoke and gas are greatly reduced.

6 *Mogul* saves binder costs – drying time – cleaning costs.

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MOGUL CAN BE USED IN CORES WHERE BOTH GREEN AND DRY STRENGTH ARE REQUIRED . . . .

Remember – By using Mogul you will increase the core maker's production, the core oven production, the foundry good casting yield and gain low casting cleaning costs.

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accentuated greatly by war. Much of what has been accomplished has resulted from a speeding up of the normal processes of simplification and standardization which are of major concern to the steel industry and to industries using steel.

While the NE steel specification effort has been directed toward standardization and simplification of products to obtain increased production to meet war needs, most of the work has been of such character to be beneficial to postwar and peacetime production. The extent of co-operation between producers and users will determine the extent of continuance of these benefits after present controls are rescinded. Cognizant agencies are fully aware of these problems and since steel mill products largely are sold on specifications, it is probable that many of the benefits will be made permanent.

Heller Awarded "E"

Heller Bros. Co., Newcomerstown, O., manufacturer of files and other tools, was awarded the Army-Navy "E" at ceremonies on Sept. 21. Presentation of the pennant was made by Lieut. Col. A. B. Witte, Cleveland Ordnance District, and employe pins were presented by Lieut. Comm. J. A. Zurfluh.

(Photo courtesy of Maumee Pattern & Mfg. Co., Toledo, O.)

HOW TO MAKE SMOOTH-AS-GLASS PLASTER PATTERNS

THE secret to making even large plaster cores like this is to use Gold Bond Pattern Plaster. The setting time is always uniform. It's easy to handle. And you get a surface on the plaster pattern that's as smooth as glass!

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NATIONAL GYPSUM COMPANY, BUFFALO, NEW YORK

HAND GRENADES MADE OF GRAY CAST IRON

(*Continued from page* 105)

molten flows into an insulated, barrel-type mixing ladle. While the iron over the spout serves excellently for radiators and boilers, it is not quite hard enough for making hand grenades. Consequently, about 5 to 6 per cent light steel scrap is placed in the 500-pound pouring ladles where it is dissolved by the molten metal. That slight addition of steel insures that the iron is within the 30,000 to 35,000-pound per square inch tensile strength classification which is required for grenades.

The grenades are made by hand in cast iron, center-bar type flasks which are used commonly for radiator production. Two sizes of flasks are employed; one being 23 x 27 x 3½ inches, and the other 30 x 23 x 3½ inches. As may be observed from the accompanying illustrations, the pattern plate contains 32 half-patterns which are mounted in two groups of 16. Each group comprises two rows of 8 patterns with a long runner down the center from which branch gates open into what becomes the solid end of the grenade. Pattern plates are mounted on a stripper machine. The grenades are produced by a squad of three men consisting of a molder, helper and core setter, and they make about 2560 grenades for a day's work.

Set Chaplets in Drag

Molding sand used is grade 1½M Cattaragus sand which is somewhat coarser than that used for stoveplate work. The first operation is setting the chaplets for the drag mold. Chaplets are the wire type commonly used in stove and radiator foundries, and three are placed on each pattern. They are located on the largest diameter with one at the center, and the other two are located about ¾-inch on either side of the central chaplet. After the chaplets are in position a small amount of sand is riddled over the pattern face, and then sand is shoveled into the flask until it almost is filled. Using their shovel handles as peins the molder and helper carefully pein the sand along the sides, ends and center bar of the flask.

Following peining, sand is heaped up on the flask, and butt rammed all over. The excess sand is struck-off level with the flask, the mold stripped from the machine, turned over and carried over to the bottom board on the molding floor. While the cope is being made the core setter places all the cores in position, and puts one tin on the top of each core at the point where the cope chaplet will rest. Due to the fact that the grenade pattern is symmetrical, the same pattern plate is used for production of the cope mold. The only difference is that a sprue plug is used with the

cope, and only one chaplet, located at the center of the pattern, is employed. Operations in making the cope mold are the same as for the drag except that the mold is not turned over preparatory to carrying it to the floor. Molds are stacked four high with each succeeding mold being staggered sufficiently so that the sprue openings of the mold beneath are not covered over and molten metal can be poured into them without trouble.

Cores for the grenades are made by hand in a gang box containing eight cavities. The cores are made in halves, and the two halves joined in the green state by an operation called "booking" wherein the two half-core boxes are brought together similar to closing a book. The top box is lifted off and a cast iron core dryer placed in position. Then the whole is rolled over and the other core box is lifted off leaving the core in the dryer. Those are placed on a rack and baked in a gas-fired core oven.

Cores Well Vented

The cores, even though comparatively small, are well vented as shown in one of the illustrations. Venting is accomplished by use of a vent plate which fits over the corebox and contains designs for each of the cores. In use the coremaker rams up the sand into the box, strikes it off level, and then places the vent plate on the corebox. Proper location is insured by guide pins and bushings. As previously mentioned, the cores have only one print about ⅜-inch in diameter and ½-inch long which is rather vulnerable to breakage. However, Dunkirk Radiator Co. found that by using a somewhat stronger linseed oil base bond, namely 1 to 45, and a hard bake, that little trouble is encountered from the print or stem breaking off.

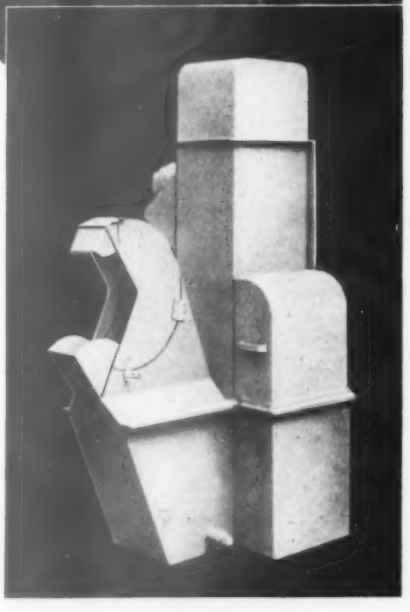
After baking, the cores are inspected. To detect any possible cracked prints or stems, the operator picks the cores up by that portion, rolling it between the thumb and forefinger. That operation immediately discloses any trouble since all or part of the print will separate from the remainder of the core. As the cores are inspected they are placed stem end up on racks. Each rack is about 15 x 18 inches and holds 45 cores. The racks with the cores are stacked on a truck and transported to the foundry floor.

Molds are poured by a separate pouring crew, and are shaken out at night by the night crew. Castings and gates are piled on skids and transported by an overhead monorail to one end of the foundry where the tumbling barrels are located. There the castings are knocked from the gates and placed in the tumbling barrels. Cleaning takes from 15 to 20 minutes. After cleaning the grenades are taken to another department where the bottom or solid ends are ground flat on a horizontal disk surface grinder. In grinding, the grenades are placed with the bottom ends down in a holder consisting of a plate containing 20 holes countersunk to conform to the contour of the grenade. Another flat steel plate attached to a lever then is brought down on the tops of the grenades forcing them against the abrasive disk.

After the ends are ground flat the grenades are subjected to machining operations and inspected. Machining consists of drilling, counterboring, facing and tapping the top end containing the hole left by the core. Drilling and counterboring the hole and facing the end is accomplished on a drill press in one operation. Tapping is performed on another drill press. Both drill presses are equipped with automatic stops so that the overall height in the facing operation, and the number of threads in the tapping operation will meet the requirements. Following those operations the grenades are inspected for any surface defects, and to see that they meet the weight requirement which is 17 ounces plus or minus ½-ounce. Then they are spray painted, dried and packed for shipment to a loading plant for the filling with explosive, and attachment of detonating mechanism.

Whiting Retains "E"

Whiting Corp., Harvey, Ill., has received renewal of Army-Navy "E" and has added a white star to the flag first awarded last March 27.



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WASHINGTON NOTES ★ ★ ★ ★

LITTLE publicized but of far-reaching importance in insuring uninterrupted production of war goods has been the work of the WPB Conservation Division on specifications. This work for nearly 2 years has been shared in by industry and by various government departments and has resulted in numerous alternate specifications which have saved sizable quantities of the most critical materials. To date almost 600 emergency alternate specifications and amendments have been completed and more than 200 additional ones are in preparation. Some of the effective ones of interest to the foundry industry are listed on page 183 of this issue.

★ ★ ★

WPB orders prohibiting the use of various materials in the manufacture of increasing numbers of products also were necessary in conserving scarce metals for uses where they would be most effective, but the trend now is starting to reverse itself. The change is barely perceptible so far, but it seems certain that subsequent moves will liberalize use of materials rather than curtail their applications. Aluminum and magnesium, two of the most critical metals not so long ago, are affected by recent modifications of this sort.

★ ★ ★

LATEST revision of the WPB order restricting uses of aluminum permits its consumption in manufacture of aluminum bottom boards for use in foundries, also in electric bus bars, cooling fans for electric motors, structural parts where lightness is an element to be taken into consideration, coils and fins for refrigeration and heating equipment, certain types of safety equipment, and x-ray equipment. Restrictions on use of magnesium in safety equipment also have been removed.

★ ★ ★

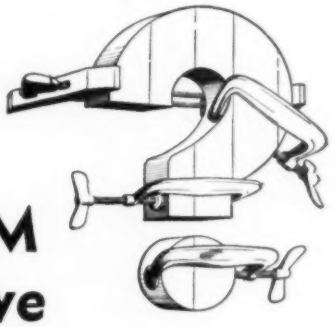
These moves, of course, still confine use of these critical materials to war and essential civilian purposes, but they are evidence of the improvement in the supply situation since the days when available quantities of certain metals were insufficient for essential war demands alone. The supply position of iron and steel also is being enhanced by plant capacity additions made the past 2 years. In the case of pig iron it is not improbable that the improved supply-demand ratio will permit abandonment of the allocation procedure some time early next year, although consumption by the foundry industry, of course, will remain confined to war goods and those civilian items specified by WPB conservation orders.

★ ★ ★

THE GOVERNMENT will have a staggering amount of material and equipment to dispose of after the war, but it already is starting to move some of its excess. WPB's Redistribution Division is beginning to dispose of an estimated billion dollars worth of used or idle machinery and equipment, much of it now owned by the government. In this case, however, sales are being made only to users certified by WPB to be eligible to purchase. More than 55,000 types of machinery and equipment will be listed in WPB regional offices, compiled from reports from used equipment dealers, user-holders, the War Department, Defense Plant Corp. and other government agencies. In all, some 10,000,000 pieces are expected to be listed, ranging from WPA sewing machines to industrial boilers and manufacturing equipment rendered idle by program changes.

★ ★ ★

When applications for authority to purchase new equipment are received by WPB field offices, they will be checked against the inventory lists and the applicant put in touch with owners of available equipment. Under recent WPB orders, application for authority to pur-



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chase many types of new equipment must be accompanied by certifications to the effect no used equipment is available. Requests to buy used equipment also will be checked against the field office files. To the extent that it is successful, the program is expected to hold down the size of the postwar problem of liquidation and absorption.

★ ★ ★

LARGER production of construction machinery parts and coal mining machinery is sought by WPB. Although present production of construction machinery parts is at the rate of 50 per cent of the total dollar volume of equipment produced, compared with 15 per cent in peacetime, not enough parts are being produced to meet requirements, and 1944 demand is expected to be even higher. Most urgently needed are parts for power shovels and cranes.

★ ★ ★

Machine tool output, on the other hand, continues its expected downward course. Unfilled orders Oct. 1 totaled a little over $333,000,000, off 14 per cent from the month before. If orders, shipments and cancellations continue their recent trends, backlogs will be cleared about the end of next February.

★ ★ ★

THE "URGENCY" plan to combat labor shortages is to be extended by WPB and the War Manpower Commission wherever necessary. The plan is handled by two local committees provided in any selected "urgency" labor shortage area. An area production urgency committee, primarily under the control of WPB, determines which production in the area is of most importance. This will usually be done on a plant-by-plant basis. Then an area manpower priorities committee, primarily under the control of WMC, advises the United States Employment Service to allot manpower to those plants where it will have the greatest impact on the war effort.

★ ★ ★

This plan previously was introduced in primary areas on the Pacific coast, including San Diego, Los Angeles, San Francisco, Portland and Seattle. Similar plans have been instituted in Akron, O., Detroit, and Hartford, Conn. An important phase of the plan is that the area involved will be given almost entire responsibility for solving its problem.

★ ★ ★

TO ENCOURAGE resumption of production of the cheapest type of small hand water pumps used in rural areas, the Office of Price Administration has authorized a 20 per cent increase in the maximum price for the "No. 2 pitcher spout pump." This pump is made of cast iron with a 3-inch cylinder and adapted for a 1¼-inch suction pipe. Previous prices were so low manufacturers were not interested in producing the pump, 250,000 of which are expected to be needed in farm areas in the year ending June, 1944.

★ ★ ★

An order issued in September, reducing from 165 to about 40 the number of types and sizes of vises which could be manufactured, has been postponed by WPB. The effective date has been changed to next Jan. 1 because it was found that some of the banned types and sizes are needed in the war effort. Meanwhile certain revisions in the schedule are being made.

★ ★ ★

EFFECTIVE Nov. 1, the Smaller War Plants Corp. adopted a new loan system which puts approved loan funds more conveniently at the disposal of small concerns engaged in production either of war material or essential civilian requirements. SWPC regional loan agents will enter into repurchase agreements up to 100 per cent with banks on loans of $25,000 or less where the banks agree to close and service the loans.

★ ★ ★

As part of the move to decentralize WPB operations, authority is being extended to field offices for the processing of PD-1A applications up to $1000 in value. Previously, field offices had authority to handle such applications up to a value of $500. A simpler application form is expected to offset partially the increased weekly load of 5000 applications that field offices will be required to process. Eventually, it is contemplated raising the limit to $2500.—W. G. G.

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MODERN METHODS IN CASTING MAGNESIUM

(*Continued from page* 111)

casting should be gated in such a way that the metal will be brought into the mold cavity at the lowest possible point, and the gates so arranged that the sprue can be filled as quickly as possible after the pouring starts. It is essential that when the pouring is started, the sprue and the pouring basin always be filled with molten metal, and it is desirable that the castings be filled through a number of small gates rather than through a few large ones, because magnesium loses its heat rapidly, and any attempt to run metal any great distance will result in misruns, especially on a casting of thin wall sections.

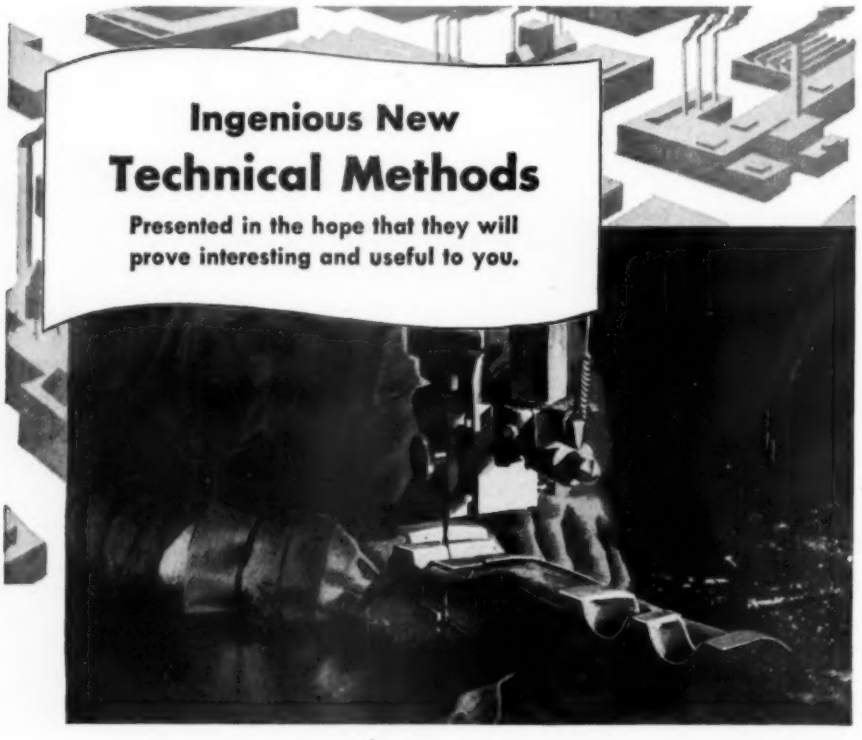
Gates should be located at sections of uniform casting thickness, and the area of the gate should be similar to the casting area at the point where the gate enters the casting. One common type of gating is to have a ring runner completely around the casting with a number of gates entering the casting around its circumference. In a gate of this type, adequate vents should be provided from the top of the runners in order to prevent building up pressure in the mold passages.

The use of pouring basins is increasing in magnesium foundries. These pouring basins should be correctly designed for size and height upon the cope—deep enough to maintain a constant flow of metal into the sprue, and long enough so that when the metal is poured into the pouring basin, it does not go directly from the ladle into the sprue. In other words, the metal should be poured into the pouring basin on the opposite end of basin from the sprue opening.

People familiar with iron and steel castings frequently do not understand why aluminum and magnesium castings require so many and so large risers. Due to the high shrinkage of magnesium, risers must be used freely to insure the soundness of heavy sections of castings. Because of the light weight and low heat content of the metal, the risers should be directly connected to the section that is to be fed. Perhaps it would be better to say that risers always should be feeding risers, i.e., as the metal in the mold cavity solidifies and shrinks, the metal in the riser should feed down into the mold to compensate for this shrinkage, so that the casting itself is solid and sound. The riser should be the last part of the entire casting to solidify. In reaming the riser in the cope, a generous fillet should be made, so that the metal has a smooth and uninterrupted flow down into the casting during the shrinkage period. If this is not done, there will be shrinkage cracks in the casting under the riser.

Use Skimmer Gates

Two types of sprues are in common use in the foundry—round sprues and rectangular sprues—and both types are used frequently. Adherents of the rectangular sprue claim that this type decreases turbulence in the metal by preventing any swirling action. Skim gates are small sections of thin sheet metal perforated with small holes, which are used as filters to keep oxide skins out of the metal and to break up the flow of the metal, so that it flows into the casting smoothly and without a high velocity. Skim gates and filters are seldom used with the rectangular sprue, whereas they are used with the round sprue. The proper place to insert the skim gate is at the bottom of the sprue, or in the horizontal runners, so that the metal will flow quietly and uniformly through the skim gates on its way to the mold cavity. Whether rectangular sprues or round sprues are used, it is desirable that they be of a size that can be choked easily, so that all the opening from the bottom gate up to the point where the metal is sprued can be filled quickly to prevent oxide skins being washed down into the casting. The proper placing of risers and the proper gating will go a long way in securing tight, sound castings.



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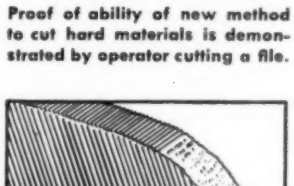

The temper of curve cut section shown above is unaffected.

X-60

On heavy sections that cannot be treated with risers, chills are used to equalize the freezing of the heavy and light sections. These chills can be either cast iron or bronze, as neither cast iron nor bronze will enter into solution with the molten magnesium. Both iron and bronze chills have their advantages. Bronze has a high heat transfer, which makes its use efficient and desirable, but this type of chill occasionally can lead to contamination of metal if by chance, a rejected casting is thrown back into the melting pot without all of the bronze chills having been removed. In melting scrap or rejected castings, extreme care must be taken so that this does not occur. Cast iron chills have an advantage in the foundry where the sand is automatically conveyed back to the sand reclamation unit, and the chills can be removed from the molding sand by means of a magnetic separator. Cast iron chills are less expensive than bronze chills, and of course, in times like these when bronze is a critical material, it is advisable not to use this material for chills, if it is at all possible to use a substitute.

Before chills are used, they should be thoroughly cleaned and heated. They should be sandblasted and coated with some type of material which will act to prevent condensation of moisture on the chill. One method is a solution of talc in alcohol with about one ounce of resin per gallon. Another is a solution of carbon tetrachloride with paraffin and talc. This mixture is sprayed on the section of the chill that is to be exposed to the metal, and then the section is dried with a torch. This operation should be done under adequate ventilation as phosgene gases are released during the spraying of the chills.

Operators Need Room

In the molding department, adequate space must be provided for bench molding and machine molding, whether small squeeze machines or the large type of jolt rollover machines are used. With reference to the large jolt rollover machines, it should not be forgotten that the operators need room and should not be cramped in their working space on these large molds. Provision should be made for side floor molding, that is for castings which are too large to go on benches or small squeeze machines but which will be made in quantities too small for putting on the large machines. Core storage, flask and bottom board storage space should be provided, so that the molders are not eternally searching for them. Adequate material handling equipment should be provided in this department, such as overhead monorails, cranes, or other devices of labor-saving nature.

There is a difference of opinion in many magnesium foundries concerning the handling of the molds after they are made. Some foundries bring their molten metal to the molding floor for pouring. The modern mechanized foundry reverses this procedure, and by means of conveyors, both power and gravity, takes the finished molds to the pouring stations, and after the molds are poured the same conveyor takes them to the shakeout station. By this method, production is expedited, using a minimum of floor space, as the finished molds do not have to be placed upon the floor to wait to be poured.

The melting department of the magnesium foundry should be placed advantageously in regard to the molding department, and its capacity should be carefully considered. For instance, if 100,000 pounds of castings are to be shipped per month, the melting capacity required must take into account not only the 100,000 pounds of castings, but also the foundry reject loss, the proportions of gates and risers to castings, and the metal loss that will occur in the foundry.

The method of handling the metal and the pots should be carefully considered, and proper means provided for lifting the weights involved. Overhead cranes or monorails should be designed and installed so that all of the metal can be taken out of the furnaces and transported without spillage to the conveyor where the mold is waiting to receive the metal. By careful design and forethought, these same overhead cranes and monorails can be used by the maintenance department in doing any repair work on these furnaces.

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The proper melting and pouring procedures in the magnesium foundry are of prime importance, because it is to this department that a large percentage of foundry scrap can be traced. There are two common types of melting practices most widely used—crucible melting and flux pot melting.

In crucible melting, the metal is melted in welded steel pots holding anywhere from 60 to 200 pounds of metal. These crucibles are then removed from the furnace, and the mold is poured directly from them. Flux pots are of cast steel and usually hold about 500 pounds of magnesium. The metal is transferred from these flux pots by ladles into the mold.

The correct procedure for crucible melting and pouring is as follows:

1. All iron scale must be cleaned from the furnaces at the start of each shift, and the crucibles inspected for weak sections by testing with a hammer. The stirrers, skimmers and pyrometer contact points should be cleaned thoroughly before each contact with the metal. A combination of clean scrap and virgin ingots is used in charging the pots. The usual practice is to fill the crucible one-third full with risers, and when these are melted to add the virgin ingots, which should be done in such a manner that bridging will not occur, as this would cause the charge to splash when the ingot falls into the pot.

Before metal is added, the bottom of the crucible should be covered with flux. Flux is then sprinkled on the metal all during the melting process, so that no burning will occur, and when the metal is completely molten, the surface should be covered with flux. At about 1300 degrees Fahr. the flux is stirred into the metal for about two minutes, after which more flux is added and the crucible brought up to about 1650 degrees Fahr. Care must be taken at 1650 degrees temperature because at high temperatures the molten magnesium will burn rapidly. The crucible should then be taken out of the furnace and placed on the floor, so that it will air cool to the required temperature. After the metal is cooled to the pouring temperature as determined by pyrometers, the hard flux crust is scraped away from the pouring lip sufficiently to allow a free flow of metal into the casting. The flux should be scraped from the inside of the crucible below the pouring lip and under the surface of the metal, and enough metal should be scraped back from the pouring lip to guarantee a free flow into the mold. The remainder of the flux should stay on top of the metal to prevent burning. A slight amount of sulphur boric acid mix sprinkled on the surface of the metal as soon as it is cooled will prevent oxidation. The heating of magnesium to approximately 1650 degrees Fahr. is called superheating and is necessary for grain refinement, which increases the tensile strength and hardness of the metal and makes the alloy easier to heat treat in later operation.

Observe Proper Precautions

The following precautions should be observed in pouring metal:

The crucible lip must be held as closely to the sprue as possible, and the metal poured carefully to avoid splashing. But the sprue should be filled to the top immediately, and it must be kept filled. The metal should be poured in a continuous stream, but in such a way that it will not run over into the risers. If a pouring cup is used, always pour into the end of the cup opposite the sprue and keep the cup full until the pouring is completed. The pouring lip must be kept free of flux at all times, and the metal drippings should be knocked off the pouring lip after pouring each mold. Care must be taken not to pour flux or dirt into the castings.

2. The same precautions for cleaning flux pots and furnaces apply as are outlined for crucible pots. In melting magnesium in a flux pot, about 70 or 80 pounds of flux first is added to the bottom of the pot, and then the risers and ingot metal are added. Flux should be constantly kept on top of the metal as it is melting, and at 1300 degrees Fahr. the metal should be stirred for 2 or 3 minutes. This varies from the procedure in crucible melting, as a scoop is used and the flux is brought up from bottom of the pot through the metal, so as to cleanse the metal thoroughly. Additional flux is added and the metal brought up to pouring temperature. A short time should be allowed for the

56

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MATERIALS HANDLING MACHINERY

metal to cool, and then it can be poured off.

In pouring from the flux pots, the pouring ladle usually is used to skim back the layer of flux and oxide on top of the metal. The preheated ladle should then be placed in the pot where this cover of flux has been skimmed back, and the metal allowed to pass through the ladle in order to clean it thoroughly. The same pouring technique for the flux pots is used as with crucibles.

During the melting of magnesium, fumes and gases are given off. Hence, the melting pots should be carefully ventilated, and the fumes drawn into stacks by some positive means, such as a fan. In some cases, it has been found advisable to provide positive ventilation in the entire melting and pouring areas. The latter is the better practice, because gases and fumes are given off during the pouring of the metal, and this section is usually beyond the reach of any ventilating equipment that may be installed over the furnaces.

Cleaning Follows Shakeout

The cleaning department comprises those operations following the shakeout of the castings, and continues right up to when the castings are finally inspected and shipped.

The work in this department is directly proportional to the molding schedule, and it is advisable to have some excess space for the storage of castings, so that if bottlenecks occur due to the molding schedule, this department will not be overcrowded. Sections and space will be needed for bandsaws for cutting off the gates and risers, grinding wheels for snagging down excess material, pressure testing equipment, buffing wheels for polishing the surface of the castings, benches for burring and filing operations, various types of sandblasting equipment and tanks, and ventilating equipment for the plating operations.

Again material handling is of prime importance. The work can be handled from station to station and operation to operation on either roller conveyors, power driven conveyors, overhead monorails, or hand trucks, and once again we encounter the need for low labor costs and speedy handling of castings.

Following the pouring of the castings, they are shaken out of the molds either by hand or on vibrating shakeout screens. When using the latter in connection with modern sand handling, the molding sand drops down through the bars of the vibrating grate onto a belt which conveys the molding sand back to the reclaiming equipment, which conditions the sand for reuse. The cores are shaken out of the castings in a similar fashion, i.e., either by hand or on vibrating screens.

The castings are then transported to the bandsaws, where the gates and risers are removed. Some foundries use saws about 1¼ inch deep with about four teeth per inch, and having a surface cutting speed of about 6000 feet per minute. This type of saw is used most advantageously on large castings. On the smaller castings, a bandsaw ¾-inch deep with six teeth to the inch and having a surface speed of about 3000 or 4000 feet per minute, is found to be satisfactory. Bandsaws used on magnesium should have quite a large set in the teeth and also a large rake to the tooth. They should be made preferably with a clearance space at the bottom of the tooth for clearing out the magnesium dust after the casting has been cut.

After the bandsaw operation, castings are sandblasted, so as to obtain a good clean surface for the first visual, or what is called, rough inspection. After this rough inspection, the castings go to the grinders where the gates and risers which are left after the bandsaw operation, are snagged down to the casting dimension.

From the grinders, the castings go into the burring department. Surplus metal, fins, etc., which are inaccessible to the grinding wheels, are removed with rotary files. These rotary files are driven by a motor from a flexible shaft and rotate at speeds up to about 3500 revolutions per minute. After these grinding and burring operations, some castings require the entire surface to be smooth. This operation is done on buffing wheels —these buffing wheels being made up of cloth sections glued together, with the surfaces or outside diameter of the

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sections having a glued abrasive powder on them.

Throughout the entire operations mentioned, extreme care should be taken, because sawcuts into the casting, excessive grinding or excessive burring can cause rejects by making the casting dimensions not compatible with the blueprints.

Magnesium castings must be subjected to a plating operation before they are shipped. This plating operation or chrome pickle treatment as applied to Dow Metal "H" is usually a solution of sodium dichromate and nitric acid. The result is an iridescent surface, which serves two purposes—as a protection against corrosion, and as a base for painting.

Castings should be thoroughly cleaned before plating, and, of course, oil, paint, or oxide films should be removed. In the plating process, the castings are immersed in the pickle solution and should be kept there approximately 30 seconds to 2 minutes, depending upon the size of the casting, with frequent agitation so that the plating solution will cover all parts of the casting. They should then be removed and immersed in a tank of cold water. This serves as a wash to remove any excess solution. After being washed in cold water, they are then dipped into hot water—the hot water dip serving to heat the casting and aiding in drying the solution.

Users of magnesium castings are turning more and more to higher tensile strengths, which makes it necessary for castings to undergo a heat treating operation.

When equipment for the heat treatment of magnesium castings is selected, the many peculiar characteristics of magnesium must be taken into account, because this is an operation where definite knowledge of magnesium is needed and where the metal's reactions must be understood and provided for. The furnace to be used in this capacity should be selected from the viewpoint of safety, i.e., it should be made as airtight as possible. The air circulating within the furnace must be positive, and the furnace should be so constructed that if for any reason a fire should occur, the fire can be confined within the furnace and not be allowed to spread to the surrounding areas. Castings should be placed on the trays within the furnaces, so that there is a good circulation.

Plenty of space should be provided for the castings to back up in front of the heat treat furnace, since it is there that they must be stamped with heat identification numbers, and many times it is necessary to store castings until the next heat. Castings must be loaded into the heat treat oven so as to produce the maximum of air circulation, and it is not always possible to push castings through in the same cycle that they come into the heat treat department.

Editors' Note: A portion of the text devoted to molding sand inadvertently was omitted near the end of the November installment of this article on magnesium foundry practice. In printing the omitted portion in this issue the introduction and conclusion are repeated for the sake of clarity.

The "as cast" condition of Dow Metal "H" will have a tensile strength of about 24,000 pounds per square inch with an elongation of about 4 per cent. A solution treatment of this alloy will increase the tensile strength to about 32,000 to 36,000 pounds per square inch with an elongation of about 7 per cent. This solution treatment is well adapted for castings that require toughness and shock resistance. If a higher tensile strength and hardness is needed, but with a lower ductility, castings are then given an ageing treatment which gives a tensile strength of 36,000 to 40,000 pounds per square inch and an elongation of 3 per cent.

Army and Navy specifications for heat treated magnesium alloys are very definite, and test bars should be included in the same containers in which the castings are heat treated, so that the physical results obtained by pulling test bars will be indicative of the physical qualities of the castings.

Introduction of an agent into the furnace as an atmosphere control will act

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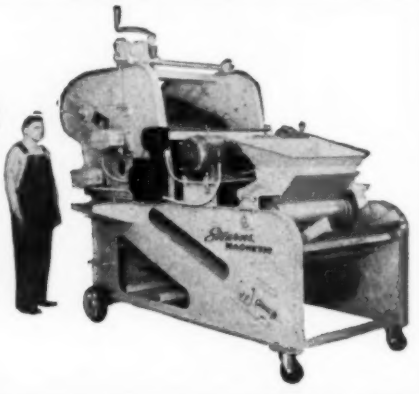

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as a factor towards safety, since it is possible to have a slightly higher temperature by using this agent. Sulphur dioxide has proved to be satisfactory, and when used at a concentration of about one-half of 1 per cent will prevent surface oxidation of the metal.

From the heat treat oven, the procedure is simple and straight towards the shipping room with only another sand blast operation and the dichromating or plating process necessary before the castings are finally inspected.

When magnesium castings were first made and their application was more or less limited to commercial use, the inspection requirements were less severe than they are today. At the present time, of course, magnesium is restricted to aircraft use, so necessarily the inspection standards are rigid.

Rough inspection means, of course, castings "in the rough", before any processing work has been applied. This rough inspection should be done with the utmost care, so as to weed out all castings that are unfit to go through any of the finishing processes, thus saving time and money in the finishing departments. It is this inspection where dial calipers should be used for measuring all thicknesses to determine whether or not there has been a core shift or a mismatch in molding. It is this inspection where the keenest search must be made for porosity, shrinkage, cold shuts, misruns, and other causes of casting rejects. The bosses should be examined to make sure that there is no lack of metal. Inspection should be made for sawcuts or burns on the castings. This particular inspection should be made with the utmost care and by inspectors well versed in foundry practice.

Experienced Inspectors Needed

An inspection after buffing is desirable so as to weed out all castings that may have been spoiled in the grinding, burring and buffing operations. Inspectors doing this work should be familiar with the castings and have a thorough knowledge of cleaning room operations.

The inspection immediately prior to the plating operation consists of a recheck on what the other two inspections have done, with a constant lookout for defects which the other inspections may have missed. These inspectors must be familiar with blueprints, with reading dial indicator calipers, and with the causes of different kinds of foundry rejects.

The final inspection immediately prior to shipment should search for any defects, such as shrinks, minute cracks, and other items of smaller nature that would be revealed by the dichromating process. Test fixtures, inspection gauges, etc., are used at this inspection.

The castings are tested for hardness and are sorted according to heat numbers. It should be the duty of the inspection department to check and measure the castings, so that every casting is not only structurally good, but also meets the requirements concerning physical qualities as revealed by the test bar poured from the same metal.

In the layout of a foundry many things may be overlooked. Don't forget that compressed air is essential! Electric outlet plugs are also needed in profuse quantities, so that vibrators and other attachments can be plugged in.

Space is needed for pattern repair, or, if you make your own patterns, for pattern making. Planning, scheduling and production control needs working space.

Employes' locker rooms, wash rooms, shower baths, and toilet facilities should be ample, not only to cover the state law, but also in excess of the state law. Many foundries are now employing female help in increasing amounts, and there should be adequate dressing rooms and toilet facilities for these employees. If the foundry is large enough, space should be provided for a cafeteria where the employes can have a clean and wholesome place to eat their meals. If space will not permit a cafeteria, at least a canteen should be added.

Space for the storage of supplies is also needed, so that they can be kept neat and in good condition, and so that a perpetual inventory can be maintained.

Then, too, space is needed for foundry layout and job layout or job engineering, where it will be decided how the pattern will be gated and where the

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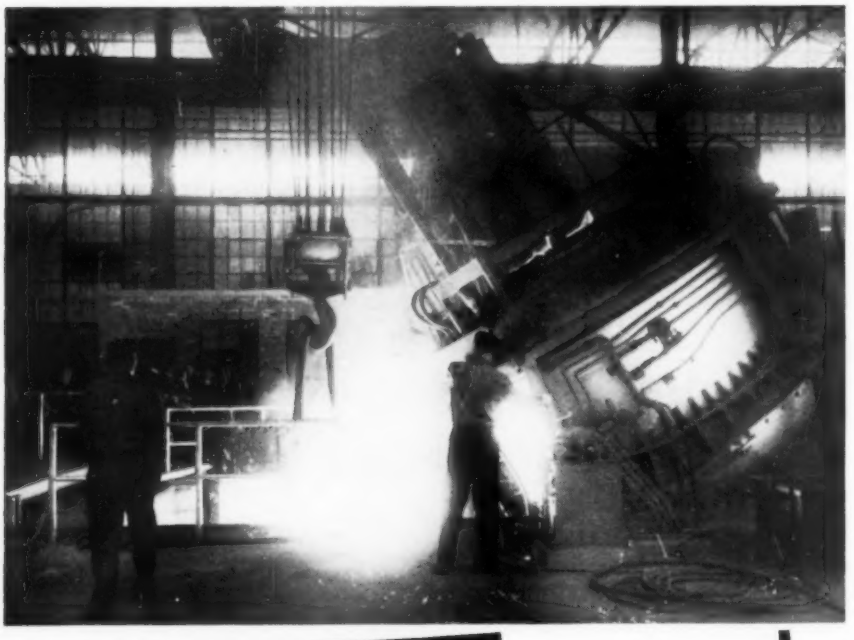
risers will be located, and for casting layout where samples are checked to make sure they are similar to the blueprints.

The modern magnesium foundry should have a physical and chemical laboratory with adequate facilities for making chemical analyses of metal, pulling test bars, checking and testing thermocouples, and testing equipment, and x-ray apparatus. Adequate laboratory control over these functions will pay for itself in increased quality many times the investment.

These are the highlights of layout for a modern mechanized magnesium foundry. The information contained in this article is not intended to be a bible of hard and fast rules for magnesium foundry practice, but is presented with the thought that it will act as a guide to many magnesium foundrymen and with the hope that it will help them.

The Bullard Co., Bridgeport, Conn., machine tool builder now engaged in the manufacture of aerial torpedoes and other war material, has won the Army-Navy production award for the third time.



Lectromelt Furnaces increase the production of carbon and alloy steels

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INOCULATION OF GRAY IRON

(*Continued from page* 117)

the results of each individual test series on separate curves, the results obtained on all series have been collected, summarized, and grouped according to physical properties. The summary curves appear as *Figs.* 10 to 23 inclusive.

(a) *Series M.* A 3.29 per cent total carbon, 2.05 per cent silicon cupola-melted, high strength iron was melted and tested according to the practice described under test procedure. Fairly large amounts of the SiMnZr inoculant were used.

From the curves, it is evident that transverse strength showed a slight increase at first but began to drop off above 0.3 Si^x. Transverse deflection increased rapidly up to about 0.4 Si^x and then dropped off. Tensile strength and hardness were decreased by increased Si^x. Openness and gas holes became apparent with Si^x above 0.95.

The fluidity of all metal containing added silicon was greater than that of the base metal; the higher silicon metals had observably greater fluidity. This effect was noticeable particularly in the case of the "star wheels," where one gate was very small.

Favorably Affect Gray Iron

This test indicated that silicon ladle additions probably have a favorable effect upon the properties of gray iron. This is especially true in the case of the smaller additions where the total silicon does not become too high. There were indications that presaged trouble with openness and gas defects if the additions are too large.

(b) *Series S.* This test, using the SiMnZr alloy on a 3.31 per cent total carbon, 2.45 per cent silicon base iron, verified the results of series *M.*

All properties showed the same trends as in the case of series *M;* in general values were lower, evidently because of the higher carbon and higher silicon of the base metal. Above 1.0 Si^x again there appeared to be marked tendency for the formation of gas holes.

It was seen that up to about 0.5 Si^x there is apparently an improvement in properties due to the ladle addition of silicon, but above 0.5 Si^x there is a dropping off of these properties. With the relatively high total carbon and silicon used in the first two series, above 1.0 Si^x the total silicon becomes so high that considerable trouble is experienced with the formation of gas holes. It appeared, therefore, that in order to obtain optimum properties, additional tests should be made on lower carbon and lower silicon alloys.

(c) *Series A.* Cupola charges were made up to yield a base iron of 3.24 per cent carbon and 1.60 per cent silicon.

Test bar trends were similar to the preceding series. Tensile and transverse strengths were somewhat higher; transverse deflection essentially was unchanged. Hardness was initially higher but tended to drop and level off with increasing Si^x. Gas holes again appeared as 1.0 Si^x was approached but were less evident than in the higher silicon base irons. Fluidity was poorer than with the higher silicon irons, but improved with increasing Si^x.

In general, properties showed an improvement up to 0.50 Si^x and dropped off above that figure. Section sensitivity was a minimum at about 0.50 Si^x. Below 0.50 the spread in hardness was determined by the high hardness of light sections; above 0.50 the spread was expanded by the low hardness of the heavy sections.

(d) *Series B.* A 3.27 per cent carbon, 1.35 per cent silicon base iron yielded improved properties over previous tests. Because of the lower initial silicon transverse strength, tensile strength, and hardness were all higher than in the previous tests. Deflection was lower.

A section cut from a large 8 x 8 x 6-inch solid cast iron block poured with 0.35 Si^x (3.27 per cent carbon, 1.70 per cent silicon) showed some openness in the center; thus it was indicated that, even with the use of ladle additions, high carbons produced unsound metal in heavy sections.

Verified Previous Results

(e) *Series C.* A 3.27 per cent carbon, 1.67 per cent silicon base iron was produced, and to it increment additions of both SiMnZr and FeSi were made in order to compare the effects of these two alloys.

The results with SiMnZr verified previous tests. As shown the FeSi addition yielded results very similar to those obtained with the SiMnZr. The transverse strength was slightly lower than that obtained by the use of SiMnZr tensile strength was the same, and hardness slightly higher. (The report on deflection results for this series was deleted because of variance with all preceding and following tests.)

(f). *Series D.* Using the previous tests as a guide, a 3.15 per cent carbon, 1.23 per cent silicon base iron was produced and exhaustively tested.

Twenty thousand pounds of the base iron was inoculated with 0.50 Si^x in the form of SiMnZr and poured into various production castings. Superior properties were obtained in all cases. All castings showed a dense gray fracture, were pressure tight, and varied from 235 brinell hardness (BHN) in one-inch sections to 255 BHN in ½-inch sections. The castings were readily machinable.

In an 8 x 8 x 6-inch block excellent hardness distribution (201-207 BHN) was obtained and the block was solid throughout.

Typical arbitration bar properties on the metal used for production castings using 0.50 Si^x are:

Tensile strength ..	49,000 p.s.i.
Trans. strength	3,150 pounds
Trans. deflection ..	0.32 inches
Brinell hardness ..	235

Various increments of inoculants were added to portions of the base metal, as in the previous tests, and like results were obtained. The SiMnZr and FeSi again appeared to be quite similar in their action.

The chill-reduction effects of SiMnZr and FeSi are shown in Fig. 3 which appeared in the November issue.

(g) *Series E.* In order to complete the range of compositions under test, a very hard 3.00 per cent carbon, 1.00 per cent silicon base iron was prepared and inoculated with SiMnZr and FeSi.

The test bar properties follow the same general trends, and the similarity between SiMnZr and FeSi again is brought out. The cross-section of a 6-inch block showed excellent hardness distribution (206-217 BHN) and soundness throughout.

Production castings inoculated with 0.50 Si^x were sound, machinable, and strong (48,000 p.s.i.); but were rather hard (269 BHN). This iron may have application in the production of heavy-sectioned castings, such as turbine blade rings and massive dies, but is too hard for general foundry use where one iron is used for a wide range of section sizes.

When You *Treat* Cast Iron With

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You *Treat* Your Customers to These Casting Improvements:

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No. 8 Mexican Graphite is used for ladle additions to treat grey cast iron. It is a dustless, low volatile graphite of high carbon content containing no sulphur or harmful impurities.

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Within the analysis range of the irons tested, the results indicate that irons containing 3.02 to 3.27 per cent carbon and 1.00 to 1.65 per cent silicon (carbon equivalencies of 3.35 to 3.77) are particularly benefited by ladle inoculation. Preferably the carbon equivalency should be 3.72 per cent or below, and the final carbon equivalency raised by ladle additions to 3.60 to 3.80 per cent to obtain maximum benefit. Such an iron is reported in Table I.

The results also tend to indicate that the quantity of silicon required to yield optimum properties generally decreases as the carbon equivalency increases. In the case of the soft base irons *M* and *S* (carbon equivalents of 3.90 to 4.04), the silicon additions were evidently too large to permit drawing final conclusions as to the benefit of inoculation in the soft iron range. The material improvement in deflection of these irons, however, is significant.

For several months an average of 100,000 pounds per day of high strength cast iron has been inoculated with various amounts of silicon additions. Fig. 20 illustrates the effect of inoculation in improving the tensile strength of typical production heats. Similar, but greater, improvements are made on the transverse properties, in accordance with the trends shown in this paper.

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And now—Soda Briquettes. They're proving their effectiveness every day in desulphurizing iron, quickly and cheaply. Substantial reductions are being recorded depending, of course, on the height of original sulphur; the amount of material used per ton of iron; the amount of contact produced between iron and treating materials.

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Of particular interest in Fig. 20 is the fact that the inoculated irons show considerably less spread and greater uniformity of results than do the inoculated irons. The greater predictability of results is believed to be the result of the action of inoculation in reducing the effect of melting and composition variables. The improved predictability contributes much to the ease of control. Similar results, showing increased predictability resulting from vanadium alloying, have been reported by Schneidewind and McElwee[13].

Wide experience in this particular foundry with both commercial ferrosilicon and the proprietary silicon-manganese-zirconium alloys, has led to adoption of the latter as a standard addition. The balanced alloy is more effective for chill control and apparently goes into solution more readily.

The present standard practice is to add 0.35 per cent of SiMnZr alloy to all high strength iron. By the use of this practice it has been found that two different base irons are sufficient to cover the entire range of sections encountered in high strength castings. One iron is used for sections from ½-inch to 2 inches and a second iron from 2 inches to 12 inches or more.

Table I—Typical Improvement

	Uninoculated	Inoculated
Type of casting	Blade Ring	Pump
Total carbon, per cent	3.20	3.21
Silicon, per cent	1.78	1.76†
Manganese, per cent	0.96	0.95
Brinell hardness*	235	229
Trans. strength, pounds*	2240	2780
Trans. deflection, inches*	0.24	0.37
Tensile strength, p.s.i.*	38650	42450
Chill depth, inches	5/16	2/16
Graphite rating*[4]		
Distribution	Interdendritic	Uniform
Orientation	Random, some preferred	Random
Graphite size*[4]	6, 7, and 8	4 and 5

*Obtained on 1.2-inch arbitration bar.

†Contains 0.35 per cent silicon in the form of SiMnZr as a ladle addition.

[4] Mahin and Hamilton—see bibliography.

Using this inoculation practice, 60,000 to 65,000 p.s.i. cupola irons containing 1.60 per cent nickel and 0.60 per cent molybdenum are being made; these irons are machinable in one-half inch sections. Similar results have been reported by Roth[27].

There have been good qualitative indications that inoculated irons possess better machinability than do uninoculated irons of the same hardness.

Further indications on production heats verify the claims that inoculated irons possess lower section sensitivity[21] and higher fluidity[17] than do uninoculated irons.

Table I shows the degree of improvement that may be expected from inoculation of an A.S.T.M. class 30 iron.

Very definite advantages may be derived from the use of silicon ladle in-

oculants in the manufacture of high strength gray cast iron.

Experimental heats, followed by numerous production heats, have established 0.35 per cent silicon as the amount of silicon to be added to standard high strength cast iron in order to obtain optimum improvements in structure and physical properties.

By causing graphitization at solidification, inoculation effectively eliminates the weak dendritic-type graphite frequently found in low and medium carbon irons, and permits the formation of the desirable random-type flake graphite. This effect may be the result of graphite nuclei formation, silicate-slime formation, or an action upon contained gases in the melt.

Greater predictability of results is held to be an important result of inoculation.

By reducing section sensitivity, controlling chill, increasing fluidity, improving machinability, and generally reducing the effect of melting variables, inoculation has made possible the casting of a wide range of casting sizes using but two inoculated irons.

A proprietary alloy containing silicon, manganese, and zirconium has been shown to be somewhat more efficient as a ladle inoculation than regular ferrosilicon.

The author gratefully acknowledges the aid and advice received from Dr. A. A. Bates, Westinghouse Research Laboratories, and Dr. G. R. Fitterer, University of Pittsburgh. D. E. Lehane, Westinghouse Electric & Mfg. Co. offered constant guidance during the course of the investigation. S. R. Vandenberg prepared the photomicrographs. The experimental work was performed at the Westinghouse foundry at Trafford City, Pa.

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Oven Stokers Fired With Hard Coal

(*Concluded from page* 148)

stoker heater unit, connecting duct work and mechanical exhaust line leading up through the building structure indicates how readily the system is adapted to building design. Coal bins filled by crane and grab bucket, normally located alongside each stoker were removed temporarily to provide unobstructed view of the firing equipment.

Combustion in the various units is so efficient that no noticeable smoke is produced. The small amount of ash is trapped in a collector arrangement a few inches below floor level and is removed every second or third day, depending on the intensity with which the ovens are heat operated. A minimum heat arrangement equivalent to banking prevents the fire from going out during any period the ovens are not in active service. During the full demand operating period, the banking system is prevented from upsetting the uniformity of oven temperature through an electrical arrangement which delays the fuel feed, provided the amount of coal to be banked should prove excessive for this period.

Inland Steel Marks 50th Anniversary

Inland Steel Co., Chicago, recently observed the fiftieth anniversary of its founding. From its beginning in 1893 on 6 acres of land in Chicago Heights, Ill., rolling small bars and agricultural shapes from old railroad rails, the company has developed into a completely integrated producer of steel pouring 3,400,000 tons of ingots a year. The main plant at Indiana Harbor, Ind., now covers more than 630 acres. Inland recently completed its integration of raw material supply by acquiring fluorspar mines.

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Reports on this new machine from users indicate that it has unusual possibilities in production of aircraft, tank and truck motor castings. At the present time we can make good deliveries, and invite your inquiries.

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Film Shows Goggle Adjusting Methods

A new sound motion picture film entitled "Right on the Nose" has been prepared by American Optical Co., Southbridge, Mass., which shows in detail the quickest and easiest methods of adjusting non-prescription industrial safety goggles so that workers can wear them in comfort. The film is said to represent an answer to industrial eye accidents caused by workers who discard improperly fitted goggles, and shows graphically that properly fitted goggles are light, cool and comfortable to wear. Film is available on loan to safety directors, medical directors or persons assigned the job of fitting goggles or may be purchased. It is 16 millimeter size and runs 14 minutes. A booklet of the same title is available to goggle fitters which explains proper methods of adjusting goggles.

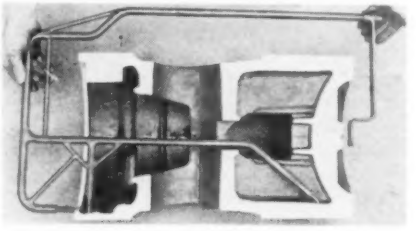
Lindberg Adds Star

For continued excellence in production of heat treating furnaces and equipment, the Lindberg Engineering Co., Chicago, has been awarded a star for its Army-Navy "E" burgee.

Device Aids Piston Machining

A valuable contribution to engine production at the plants of the Cooper-Bessemer Corp., Mt. Vernon, O., and Grove City, Pa., is a simple device shown in the accompanying illustration, designed to save time and to overcome the difficult problem of producing engine pistons with consistently uniform wall thickness. Developed and submitted by John V. Shaffer, machinist, the jig is constructed of several pieces of steel tubing welded together.

The end of the jig is inserted through the narrow opening at the bottom of



the piston so that it comes in contact with the wall inside the cored chamber. By revolving the jig around the outside and inscribing marks at intervals on the outside surface by a sharp pin in the outside end of the jig, the true center of the casting is determined at the point where the inscribed lines intersect. The lathe operator thus is able to save a considerable amount of machining time and produce a piston with the outside diameter concentric with the inside, and with absolutely uniform wall thickness so desirable in oil cooled piston operation.

Chicago Metal Guild Section To Meet

The Chicago section of the Electric Metal Makers Guild Inc. will conduct a one-day meeting on electric steel melting practice, Dec. 4, at the Morrison Hotel.

The morning session, starting at 10 a.m. will be a joint meeting of the ingot and casting sections. At 1:15 p.m. there will be separate panel discussions for the ingot and casting sections.

Shop and Mail Early

Acute shortage of trained personnel in post offices throughout the country makes the slogan of previous years "Shop and Mail Early" more imperative than ever. Consequently the Post Office Department is requesting that mailings be made 25 to 30 days before Christmas, depending on the distance, to prevent bottleneck conditions of last year.

Renew Mathieson "E"

Mathieson Alkali Works Inc. has been authorized to add a white star to the Army-Navy "E" flag awarded its Niagara Falls, N. Y., plant last February, signifying continued excellence of production.

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Minneapolis, Minn.	Smith-Sharpe Co.
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WOMEN MAKE ALUMINUM CYLINDER HEADS

(*Continued from page* 102)

places an aluminum core dryer on top of the core. The dryer in position is shown in Fig. 4. The dryer is delivered to the operator on the roller conveyor shown back of the rollover machine in Fig. 4, and in the foreground of Fig. 5. This conveyor places the dryer in position so that it may be placed on the core without much effort on the part of the operator.

After the dryer has been placed in position, the core is rolled onto the platform of the rollover machine. This is a specially designed machine for the particular operation and is controlled easily by two push buttons and two levers. As the flask and core are clamped in position, the core is rolled over and drawn, as shown in Fig. 4. When the core is on the platform, the operator presses a button and starts the rollover cycle. As the platform moves up, four equalizer pins move down, and when these are in position, the operator locks the pins and clamps the core in place by means of a lever. As the rollover is being completed the vibrator is started and the core is drawn with the core dryer resting on the special type of roller conveyor, as shown in Fig. 4. The flask and pattern then are rolled back, unclamped, and pushed onto the conveyor to be returned to the cleaning station. This conveyor may be seen between the operator and the automatic rollover machine in Fig. 4, passing under the core dryer conveyor in Fig. 5 and in front of the cleaning station in Fig. 2.

Only Few Wires Needed

The intricate core with the thin fins is shown in Fig. 6 just after being drawn. When it is remembered that this core has wires only along the top edge of each fin, as shown in the illustration, and along the center support which is illustrated in Fig. 1, and when it is considered that the entire core has been produced by six girls using a vibrating machine, a jolt machine, a core blower and a rollover machine, it must be realized that the Caterpillar practice differs radically from that in use in most foundries producing similar castings. While it is not possible to give production figures at this time, it can be stated that production has met expectations, and that the output can be considered exceptional.

The method of making fin body cores in this manner is claimed to be original with Caterpillar Tractor Co. The prior art concerns the placing of a shroud around the fin section of the cylinder head and vibrating sand into the fins, the placing of nails in certain sections, and the jolting of backing sand within the shroud, thus completing the mold at this point to the height of the core box. The shroud then is removed and replaced by four rods, two resting on stools and two others at right angles resting on the rods first placed. The flask then is placed under a core blower for the completion of the entire mold by the core blowing method. The pattern continues on to a rollover machine which is operated by push button control. The core is drawn away from the pattern and rolled out on a roller conveyor and by push button control the rollover machine is returned to its original position for removal of the pattern. It is then prepared to continue with another similar operation. In addition there also was developed in another instance the art of blowing the entire core which consisted of placing the sand within the fins as well as the backing sand by the core blowing method.

From the rollover machine conveyor, molds are lifted to the core racks supported on monorails, as may be noted in the background of Figs. 2 and 5. The cores are carried on racks through the horizontal baking oven which extends approximately three-quarters of the distance across the east side of the foundry. A part of the oven is devoted to heating and baking, the remainder to cooling, and the core racks leave the oven at the same end as they entered. As the

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cores emerge from the oven, they are removed from the rack and placed on a conveyor for transportation to the section of the plant devoted to core cleaning, spraying, drying and assembly. The work of transferring the core from the conveyor rack to the second conveyor is accomplished by women, with the aid of a special sling developed for the purpose by the plant engineers.

Considerable care is exercised in seeing that the cores are entirely free from any loose sand and dirt. Following a cleaning operation, which also includes an inspection, the mold surface of the core is sprayed with a special preparation and the core then is dried in a horizontal type oven. After drying the cores are moved along on the conveyor, shown at the right in Fig. 9, where the face of the core is smoked with an acetylene torch. From here the mold cores are transferred to the second conveyor, the interior cores are set in place and the mold is clamped with the equipment shown in the foreground of Fig. 9. All of the work in connection with cleaning, spraying, drying and assemblying is accomplished by women. The small cores are made by women on machines located to the south of the mold core conveyor loops and are dried in a vertical type baking oven. Method of gating the casting may be determined by studying several of the accompanying illustrations, including Figs. 9, 10 and 12.

The completed mold for the air-cooled cylinder head, made entirely of dry sand cores, is picked up by a monorail hoist and placed on the pouring conveyor, as shown at the right in Fig. 10. The pouring conveyor, which is in the form of a loop approximately 190 feet across the long diameter, carries the molds from the loading station around the loop to the pouring station on the opposite side, and then around the far loop to the shakeout which is not far from the loading station.

Extent to which women are used in this foundry perhaps is best illustrated in Fig. 11, a view of the furnace charging floor. The two young women in the foreground are charging ingot into the 1000 pound melting furnaces. The woman at the second furnace in the row is skimming the residue from the furnace pot that previously was chlorinated, and the woman in the rear is inserting the chlorination tube into the molten aluminum for the removal of oxygen. Nine furnaces are employed and these are well hooded, as may be observed in the illustration, for the removal of fumes. The furnaces have pyrometric control, with recording instruments located on posts in the rear.

Metal Poured Rapidly

But the extensive employment of women in the melting department is not confined to the charging floor. Fig. 7 shows the tapping and pouring floor, and reveals that women take metal temperatures, skim the ladle and tilt the melting furnace by means of a lever actuating a hydraulic pump. At present the actual pouring is done by men. Metal is brought from the furnace in two hand ladles supported from a monorail. The mold is filled in approximately 1.5 seconds, the two men dumping their ladles in the same mold at the count of three.

All gates, spills and other home scrap is remelted in the furnace which may be seen in the background of Fig. 11, and is poured into ingots. Therefore all of the metal handled on the charging floor of the melting furnaces is in the form of ingot. At the same time, remelting and pouring into ingot removes dirt and other contamination from the metal, thus aiding in the production of high quality castings.

Equipment for shaking out the castings is shown in Fig. 12. The mold core is picked up from the pouring conveyor with a push-button controlled hoist equipped with special type tongs, shown in the illustration, and is deposited in the vibrating shakeout to break the mold core to a certain extent. After the body core has been broken, the casting is lifted out and placed on the vibrating board, shown at the center in Fig. 12, for shaking the sand from the fins. The board consists of four chipping hammers so mounted as to strike the riser and the pouring base section continuously. The woman at the left is stamping heat numbers on the casting to correspond with

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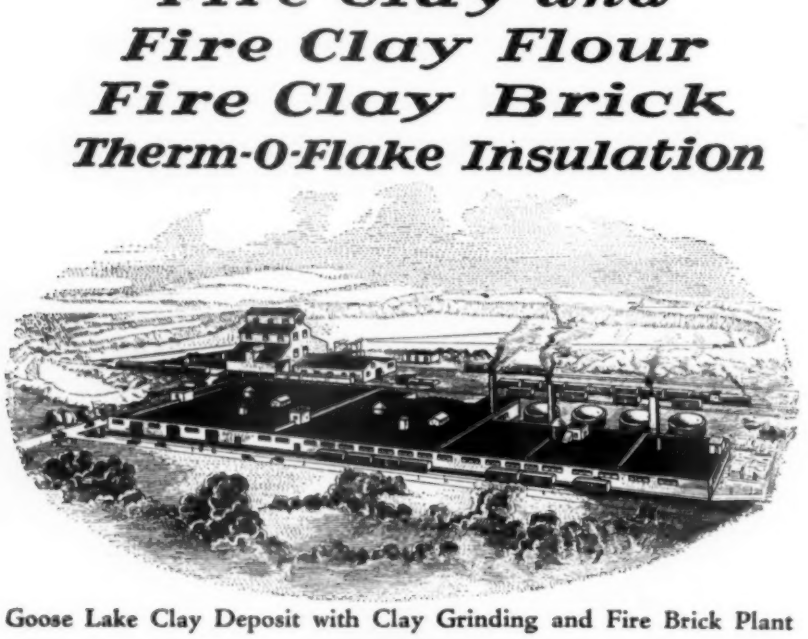

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test bar numbers for laboratory examination.

Gates and risers then are removed by the band saw shown in Fig. 13. The pneumatic piston which pulls the castings through the band saw at the desirable speed is shown in the foreground. The castings then are given a rough clean, and are sandblasted in a machine located along the core oven at the east side of the foundry. They then pass to the preliminary cleaning department where they are ground on stand grinders, and the fins are slotted on the two machines shown in the foreground of Fig. 14. These machines have thin abrasive wheels which are swung between the fins of the casting for removing the supporting bar cast in the top of the fin section, as shown in Fig. 1. The table on this type of machine is indexed manually by the operator, and these women have developed great skill in performing this job with the precision that would be expected of mechanical indexing equipment.

Use Small Tools

Much of this cleaning work is done with portable grinders and other small tools which can be operated with ease and considerable accuracy by women. The castings then are given a water test, as shown in the left foreground of Fig. 15. After finished cleaning, castings are placed on steel racks with their test bars where they receive solution and age treatment. The inspection department is shown in Fig. 16. Here the castings come from the final sandblasting cabinet in the rear. Castings are then placed into a fixture attached to a milling machine which was designed and built by Caterpillar Tractor Co. The fixture is equipped with targets corresponding with all machine surfaces. The castings are then clamped and all locators milled. This procedure enables the operator in the machine shop to place the cylinder head in the machine with the assurance that all finish requirements are correct. Castings are then brinelled by an automatic brinelling machine. Method of packing for shipment is shown in Fig. 18.

Cleanliness is one of the outstanding features of this plant. As has been the result on other plants where women have been employed, Caterpillar management has found that women take more interest in plant housekeeping than do men. Wherever there is a slight pause in any of the manufacturing processes, these women make good use of the time by cleaning up around their stations. As may be noted in the various photographs, the aluminum foundry of the Caterpillar Tractor Co. probably could take a first prize in any competition for cleanliness and good housekeeping.

Meehanite Metal Corp., New Rochelle, N. Y., has arranged with Russell Allport & Co. Pty. Ltd., Hobart, Tasmania, for the production of meehanite castings.

Book Gives Salvage Information

The first comprehensive practical manual on industrial salvage ever prepared has just been published by the Technical Service Section, Industrial Salvage Branch, War Production Board, and is now being distributed to industry.

The new book, entitled, "Salvage Manual for Industry," contains 245 pages of systematically organized and classified information and data—most of it of a "how-to-do-it" nature—on industrial salvage practice in all its ramifications. Material is presented in 26 chapters, grouped into 6 major sections. Contents cover organizing and planning the salvage department; administrative factors; methods of handling metal scrap; nonmetallic waste; case histories demonstrating exemplary practice; a 17-page compilation of practical hints for handling specific waste materials; and a 9-page index.

"E" Pennant Renewed

For continued meritorious war production, the American Foundry Equipment Co., Mishawaka, Ind., has been awarded the white star to be added to its Army-Navy "E" flag originally awarded on March 20, 1943.

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STUDY MALLEABLE CASTINGS

(*Continued from page* 108)

for one hour which changed the martensite to sorbite but retained the characteristics of a sorbitic matrix containing grains of ferrite and nodules of graphite scattered throughout.

The presence of combined carbon in the matrix very greatly increased the strength of the irons, but also correspondingly reduced the ductility and the shock resistance.

Conclusions

The following conclusions may be given:

1. The notched bar toughness of all irons decreased at sub-atmospheric temperatures; however, in only one case was this increasing brittleness displayed by a sudden drop in the double width Charpy bar values. In all other irons, the loss of resistance was gradual and the double width Charpy bar values were approximately twice the values obtained from the single width bars.

2. Although the unnotched bar values also dropped off with temperature, the loss was slight and all the malleables, except cupola malleable *G* and the pearlitic malleables *E* and *F*, were substantially resistant to impact.

3. The detrimental effect of combined carbon on toughness is illustrated by the improvement wrought in the unnotched bar and wedge test results for iron *D* after an anneal to remove pearlitic areas.

4. The malleable irons did not appear to be particularly sensitive to low temperatures in the tensile impact tests, but the pearlitic malleables behaved more erratically.

5. The "Flecto" treatment given to the plain and cupola malleable irons considerably enhanced the ability of irons *A* and *B* to absorb impact energy in the notched condition, though the unnotched Charpy specimens were apparently unaffected by this treatment. In the case of the notched specimens the air quench from 1200 degrees Fahr. was somewhat more efficacious than the water quench from the same temperature. The treatment seemed to have little if any effect on impact properties at room temperature or above, although normally galvanizing embrittlement is observable at room temperature when it occurs. The effect of this treatment on the other irons was negligible.

6. At elevated temperatures the best combination of properties in all irons occurred in the temperature range of 75 to 200 degrees Fahr. Above these temperatures, ductility either remained constant or fell off up to about 600 degrees Fahr.; Charpy values fell off continuously to about 1000 degrees Fahr.; wedge test results generally reached a low point at

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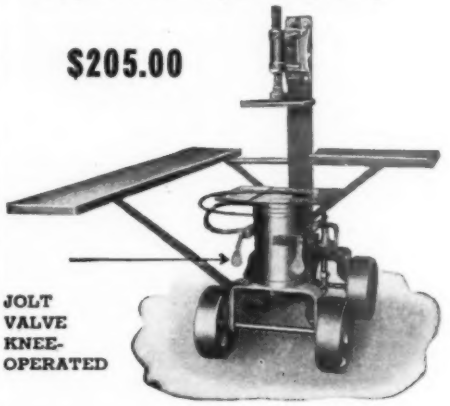

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temperatures ranging from 400 to 800 degrees Fahr.; and tensile-impact values dropped steadily to about 800 degrees Fahr. The strength held up fairly well to 600 degrees Fahr. Above this temperature it dropped off rapidly while the ductility correspondingly increased.

7. If the irons are compared on the basis of types, it is seen that the normal phosphorus, standard malleable irons, *A* and B, had satisfactory strength and ductility from room temperature, the lowest tensile test temperature, to 600 degrees Fahr. These irons had good impact properties over a considerable range of temperature, iron *A* possessing good resistance in the wedge and Charpy bar tests from about —50 to 300 degrees Fahr., and iron *B* from—20 to 400 degrees Fahr.

The low phosphorus, short cycle malleable irons, *C* and *D*, had about the same strength, but somewhat lower ductility than the normal phosphorus irons, although they followed approximately the same trends with temperature. These irons, when machined and free from combined carbon, had approximately the same impact properties at low temperatures as the normal phosphorus irons. However, iron *C* behaved erratically in the wedge test at all testing temperatures, while iron *D* had poor resistance to impact until given an additional second stage anneal to remove traces of combined carbon. The heat treatment of this iron improved its shock resistance markedly throughout the low temperature range and up to 600 degrees Fahr.

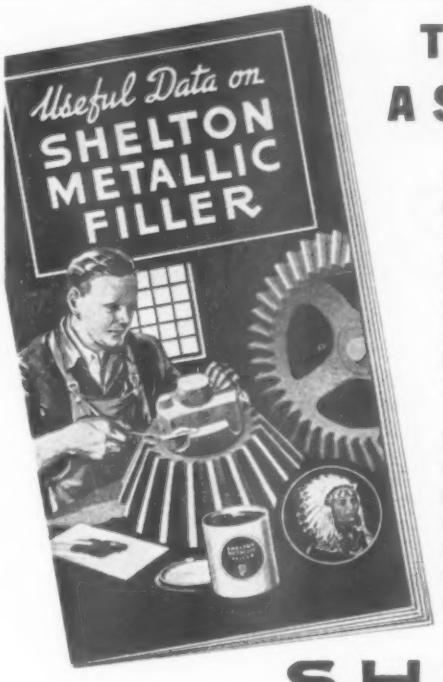
Increase Notch Toughness

Provided that possible detrimental conditions arising from the use of the short cycle iron analysis and annealing treatment have not over-shadowed the effect of reduced phosphorus in irons *C* and *D*, it was apparent that the only gain that might be attributed to the restricted phosphorus content was the slightly higher notch toughness of iron *C* at low temperatures.

The cupola malleable iron showed little change in short time tensile strength in the temperature range from +32 to 600 degrees Fahr. At higher temperatures the strength decreased rapidly. At no temperature did it possess good resistance to shock.

The several types of pearlitic malleables had high strength combined with considerable ductility over the temperature range of + 30 to 600 degrees Fahr., above which there was a drop in strength and an increase in ductility. These materials had good shock resistance near room temperature but they rapidly deteriorated in this respect as the temperature decreased and, at a slower rate, as the temperature increased. As a group, their impact properties and ductility are inferior to those of the standard malleables at both high and low test temperatures.

Grateful appreciation is expressed to the following companies for furnishing the malleable irons for these tests and to the Ohio Malleable Iron Co. for the use of the wedge impact test machine:



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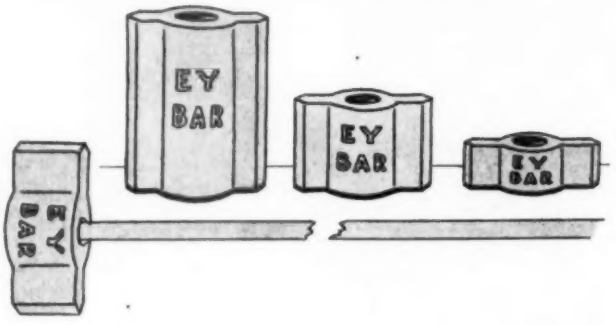

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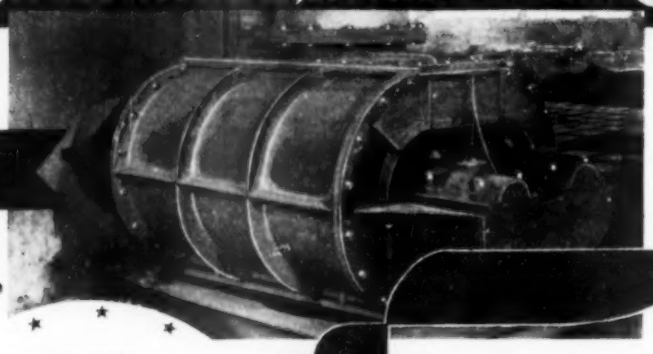

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Discusses Material Handling Equipment

Widespread use in the foundry of mechanized material-handling equipment was discussed by Ezra W. Clark, vice president and general manager, Clark Tructractor Division of Clark Equipment Co., Battle Creek, Mich., at the eleventh semi-annual meeting of the American Society of Tool Engineers, held at Indianapolis, Oct. 11.

In his talk entitled "Industrial Trucks and Tractors in American Industry," Mr. Clark said in part:

"It is in the foundry that the widest use is made of mechanized material-handling equipment. Here skid racks and elevating platform trucks—both gas and electric-powered—are used for the handling of green cores. At the shakeout operation, rough castings are commonly dumped into steel skid boxes similar to those used for the handling of forgings. Dump hoppers may be set aside, loaded, and then picked up and carried and dumped by industrial trucks which service tumbling mills for both hard and annealed castings.

"Furnaces are often loaded with scrap dumped from hopper trailers and ladles of molten metal are carried on industrial trucks between cupolas and pouring floors. Clean-up on foundry floor, gathering of sprues, clearing of sand—all are duties of the lowly truck.

"Engineers like new ideas and I am indebted to George E. Stringfellow, vice president to Thomas A. Edison Inc., for an interesting development in the metal field, the so-called "consumable pallet." Metal used for die castings is cast in the form of pigs which interlock to form units which may be picked up and handled by fork trucks, thus giving the effect of a pallet. It is just as easy to cast foundry metal in usable form as it is in bulk, and much more economical.

"The engineer who brings to his industry a cost-saving feature, is not only a worthwhile employe, but a patriot, as we shall see in the forthcoming years when national prestige, as in this war, may be preserved only by the improved production practices!"

To Hold 1944 Metal Show in Cleveland

The 1944 National Metal Congress and War Conference Displays will be held in Cleveland's public auditorium next Oct. 16 through 20, according to an announcement by the board of trustees of the American Society for Metals.

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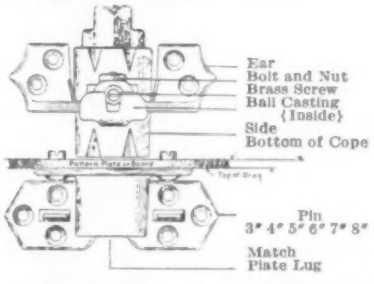

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NEW STEEL FOUNDRY MAKES NAVY CASTINGS

(*Continued from page* 115)

on the chains. Gradually the block of sand is inched away from the more or less vertical face of the pattern. When it has been moved a sufficient distance the hooks are released and the crane is attached to the pattern where the swaying action is repeated until the pattern comes clear. The drawback or drawbacks then are returned to place and the mold is cored and closed. A heavy steel chain with the hooks projecting above floor level, is laid in the bottom of the pit and then the space between the molds, and the spaces at one end and one side are filled with sand rammed firmly in place. This is reclaimed sand from the shakeout. One of the cranes is hooked on to the chains some time after the castings have been poured. When the chain is pulled up it breaks the mass of sand in the pit and facilitates removal of the castings.

Surface Nailing Eliminated

Part of the mold for an exceptionally large casting weighing approximately 40 tons as cast is shown in Fig. 2. One of these castings lying on the cleaning room floor is shown in Fig. 10, and as it appeared partly stripped in the pit in Fig. 12. The outside skin is clean and smooth and there is no evidence of fins or strains around the bottom. Incidentally the face of the mold is not covered with a silica wash or any other facing material. Surface nailing is almost entirely eliminated. Brackets, designed to prevent skin tears and cracks are replaced by rows of small chill plates set in place and rammed up with the pattern. This may be noted on the vertical wall of the mold shown in Fig. 2. For the guidance of the molder the position of the plates is marked on the pattern, in this instance yellow on a red background. Cores to form the trunnions and other small cores to form the test coupons are set in place in the same manner. Gates which enter the mold at several points are formed in tiles with male and female joints. The gates converge on a central sprue which extends to the top of the cope. A ring of fire brick on end and set at an angle and surrounded by packed sand in a runner box constitutes the pouring cup into which the metal from the nozzle in the bottom of the ladle is directed. Although each furnace is rated at 50 tons capacity, the entire heat for one of these castings is melted in one furnace and poured from a single ladle. In the old foundry this was a three-ladle job.

With the pattern properly located in the pit, a wood bulkhead is built at both ends and sand is rammed between the pattern and the back wall of the pit. This part of the mold is not disturbed until the time comes to lift the casting. The

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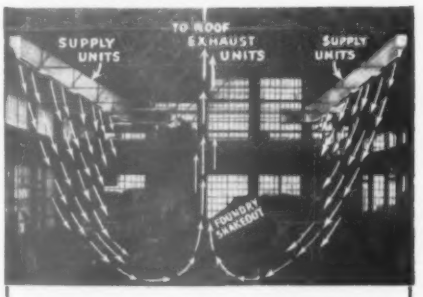

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planks are removed to reveal a vertical parting area on the center line of the round end and flush with the straight or opposite end of the pattern. Additional bulkheads are set up as required to take the sand which forms the walls at the remaining side and ends of the pattern. Subdivisions and other parting areas are established to facilitate removal of the various blocks of sand after the pattern is entirely enclosed. Each block of sand is reinforced with a few rods and is provided with suitable hooks for handling. The greater part of the interior is filled with sand and rubble from the shakeout. To a certain extent the method is comparable to that employed in large statuary molding where the mold is built up piecemeal, disassembled for the removal of the pattern and then reassembled for the reception of the metal.

The blocks of sand which may vary in weight between 1 and 2 tons are lifted away one at a time and placed temporarily on the floor in the vicinity, but definitely not on the gangway! The pattern then is wiggled, inched away from the back wall and lifted out of the pit. A number of cores are set in the bottom of the mold and then the loose pieces or drawbacks are returned to place. As pointed out elsewhere, the sand blocks become so hard that they can be handled and lifted without building them on plates.

Core Built on Heavy Arbor

The circular cross section tapered core which extends through the barrel of the casting is 21 feet in length and is constructed in one piece around a substantial steel arbor shown to the left in Fig. 5. The rectangular opening at the top provides a means of attaching the crane, and later for anchoring the core in the mold. The core also is anchored to the bottom of the mold by a long upright bolt attached to a binder bar. This bolt is fixed in position before any sand is rammed under the pattern in which an opening is provided.

The arbor, an elaborate job in itself, is flame cut from 2-inch thick steel plate, with a longitudinal rib of the same shape and material welded along the center line on each side. The arbor is laid in a half corebox lying horizontally on the floor, and cement bonded sand is rammed around the arbor. A considerable part of the space is filled with reclaimed sand and rubble to serve the double purpose of increasing permeability and providing the collapsible factor that will permit the casting to contract without rupture. This inert and bondless material also facilitates the removal of the core from the casting.

The upper part of the corebox is a skeleton frame in sections placed in position after the lower half of the corebox is filled with rammed sand. Additional sand is rammed roughly to approximate the shape of the upper half of the core. Surplus sand is removed by suitable strickles riding on the ribs of the skeleton frame. The frames then are removed and the core is allowed to remain in the lower half of the corebox until it has dried and hardened or for a period

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of 24 hours. It is then lifted out of the box, raised to a perpendicular position and lowered into place in the mold. An opening in the side of the core about 2 feet from the bottom permits the molder to place a piece of steel plate and a nut on the bolt referred to previously. The plate rests on internal shoulders on the arbor and the nut is screwed down tight to hold the core firmly in place. The opening then is filled with sand, packed in tightly and shaped on the outside to match the contour of the core. A binder bar across the top, with a rectangular opening to engage the top of the arbor, holds the upper end of the core properly in the center and also allows for expansion, which takes place due to elevated temperature, when the core is surrounded by molten metal.

This is the second and concluding article dealing with the new steel foundry of Birdsboro Steel Foundry & Machine Co. The first article, covering various general features of the plant, appeared in the November issue.

THE EDITORS

Ironton Fire Brick Holds Conference

Ironton Fire Brick Co., Ironton, O., held a sales conference at its new plant and the Henry Clay Hotel, Ashland, Ky., Oct. 15 and 16. Present included: E. F. Myers, president, C. E. Bales, vice president, H. R. Donald and E. J. Bell, Milwaukee, E. A. Swenson, Washington, Earle A. Beeman, Detroit, H. H. Klein, Boston, F. McCarthy, Columbus, O., and Henry M. Witmyer, Baltimore.

An interesting paper on the service results obtained from Ironton Caro-Line siliceous ramming refractory in ladles, electric furnace bottoms and side blow converters was presented by Mr. Beeman. Mr. Donald discussed the service results obtained from the company's refractory bonding mortar in cupolas, ladles, malleable furnaces and electric furnaces. Mr. Myers outlined the contributions of the company to the war effort and Mr. Bales discussed the outlook for refractories after the war. A dinner was held Friday evening at the Bellefonte Country Club, those attending also including directors and other officials and key operating men.

Link-Belt Co. Wins Fourth "E"

Link-Belt Co.'s Caldwell plant in Chicago was awarded the Army-Navy "E" on Oct. 7 for excellence in production of vital war material, making it the fourth Link-Belt plant to be thus honored. Other Link-Belt plants winning the "E" award are: Link-Belt Ordnance Co., Chicago, on June 14; Link-Belt Co. Ewart plant, Indianapolis, on June 17; Link-Belt Co. Pershing Road plant, Chicago, on Aug. 20.

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FOUNDRY ACTIVITIES

CLEVELAND CO - OPERATIVE STOVE CO., Cleveland, has announced that its foundry division will henceforth operate as the Cleveland Foundry Co., which will continue to operate the present foundry in Cleveland. The plant has been engaged in war production since long before Pearl Harbor.

The Cleveland Co-Operative Stove Co., whose officers are James Mitchell, president, Homer Britton, vice president, and Fred G. Miller, secretary and treasurer, was founded in 1866 by a group of iron molders, just returned from the Civil War. Though originally a co-operative enterprise, the company was incorporated in 1867. In the late nineteenth century, when the early wood, coal and oil stoves were made of heavy cast iron, distribution was necessarily limited to nearby local areas. As the modern gas range developed and distribution became national in scope, the company's foundry and range manufacturing activities developed into two distinct units, with the foundry division operating in a separate plant. The company's range manufacturing operations are now to be carried on under the name of Grand Home Appliance Co.

• • •

September orders for foundry equipment had an index number of 346.6, compared with 390.4 in August and 446.4 a year ago, according to the Foundry Equipment Manufacturers Association. The index takes 1937-39 average sales as base. Orders for new equipment dipped sharply in September to 268.7 from 341 in August, while repair orders jumped to 621 in September from 556.9 the preceding month.

• • •

National Bronze & Aluminum Co., Cleveland, has received a letter of intent from Defense Plant Corp. covering a grant of about $2,000,000 to double the company's casting production. The money will be used largely to modernize the company's two Cleveland plants, involving installation of new equipment and machinery.

• • •

Sterling Aluminum Products Inc., St. Louis, has started construction of a new $300,000 foundry building at 2800 Magazine Street. The one-story building will measure 300 x 140 feet. John Hill Construction Co. is the contractor.

• • •

Alloy Metals Co., 1000 Berry avenue, St. Paul, has been incorporated with $100,000 capital to operate a foundry, by P. W. Casey, Willard A. Morse and Henry C. Klages.

• • •

Defense Plant Corp. has let contract for a one-story factory addition at Cedarburg, Wis., to cost about $200,000 and to be operated by the Metal-Mold Corp.

• • •

Beach Foundry Ltd., Ottawa, Ont., in association with Department of Munitions and Supply, has placed contract for construction of plant addition to cost about $15,000 with equipment.

• • •

Scullin Steel Co., St. Louis, is completing a new three-story office building measuring 150 x 50 feet. In addition to the usual offices, the building will include a large dining room for employes.

• • •

Charter Oak Stove & Range Co., St. Louis has been purchased by the Reynolds Metal Co., aluminum producer. Enlarged production of household appliances after the war is planned.

• • •

Allyne-Ryan Foundry Co., Cleveland, is making various plant alterations, including a passageway, penthouse and addition, to cost about $7600.

• • •

Brillion Iron Works, Brillion, Wis., has let contract for a one-story factory building, 60 x 63 feet.

• • •

Wellman Bronze & Aluminum Co., Cleveland, plans addition of a one-story boiler and heater building, coal storage and smokestack, to cost about $77,000.

• • •

Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., has let contract for an addition to its annealing building.

• • •

Clarke Steel Inc., 1860 East Gage Avenue, Los Angeles, is making alterations and improvements to its foundry buildings at a cost of $5200.

• • •

Modern Pattern & Foundry Co., 5708 Alcoa avenue, Vernon, Calif., is constructing a new core room at its plant.

• • •

Allied Steel Castings Co., Harvey, Ill., is adding a one-story heat treating building 120 x 300 feet.

Winners in Safety Contest Named

Winners among foundries for the best safety records in the contest conducted by the Metals Section of the National Safety Council were announced during the recent Safety Congress in Chicago as follows: E. I. du Pont de Nemours & Co. Inc., Wilmington Shops; American Radiator & Standard Sanitary Corp., Louisville works; James B. Clow & Sons, Coshocton, O.; Louisville Car Wheel & Railway Supply Co., Louisville; Republic Steel Corp., Ideal Foundry Division, Newton Falls, O.; American Rolling Mill Co., Ashland, Ky.

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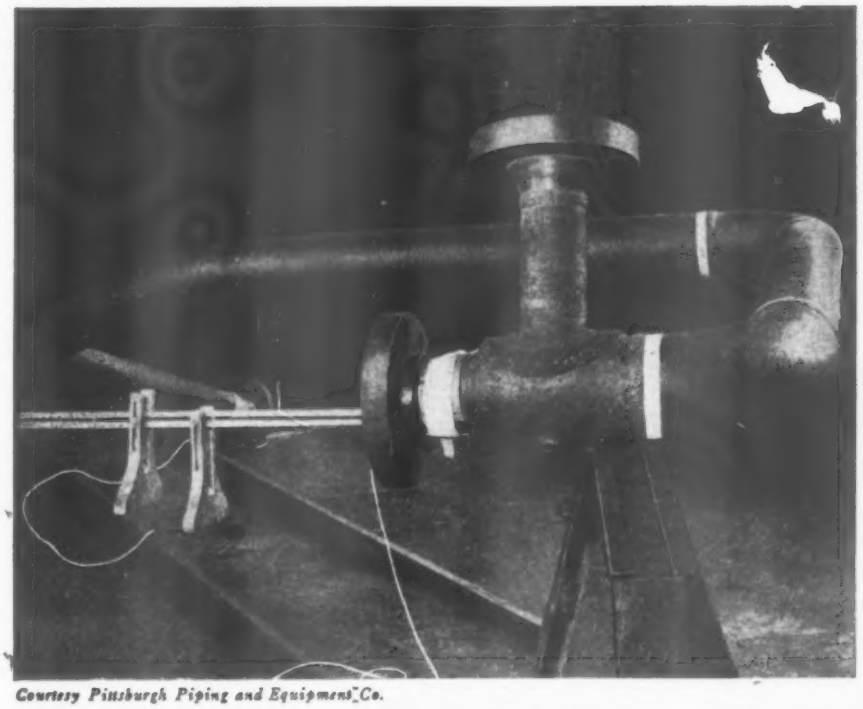

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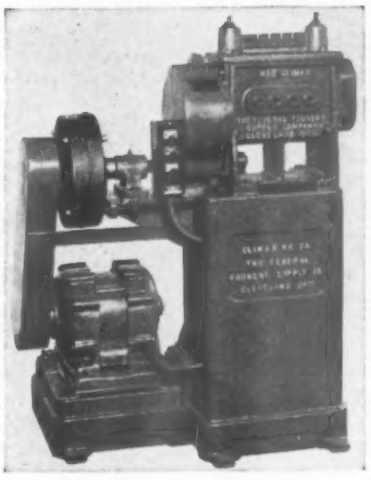

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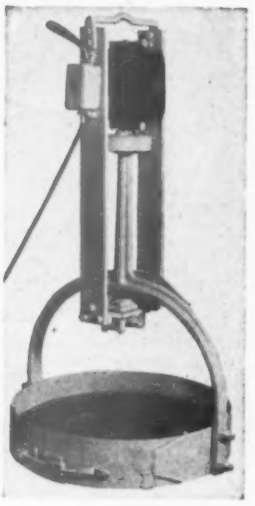

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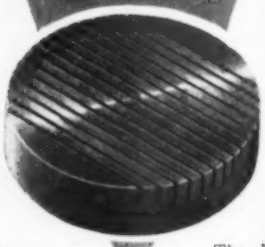

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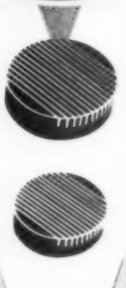

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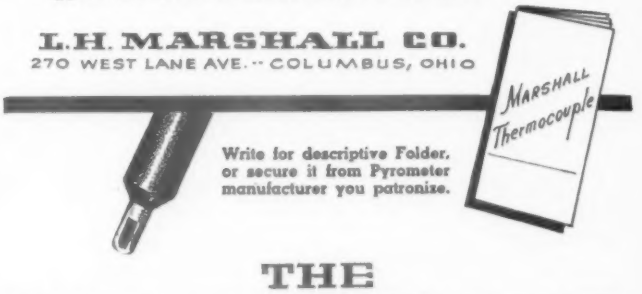

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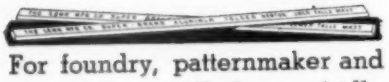

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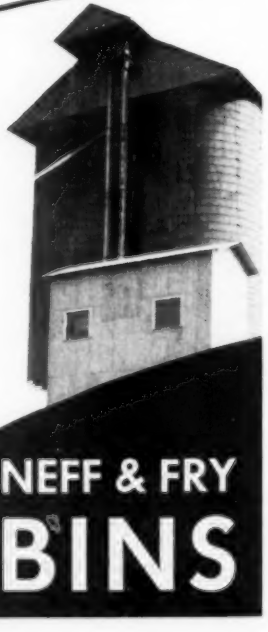

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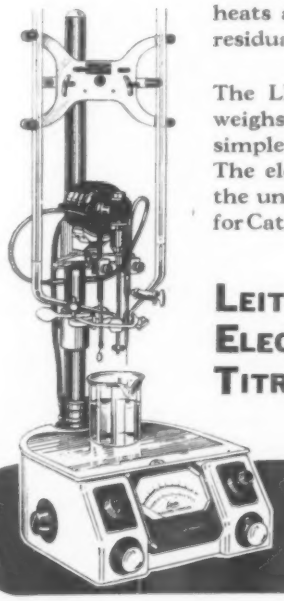

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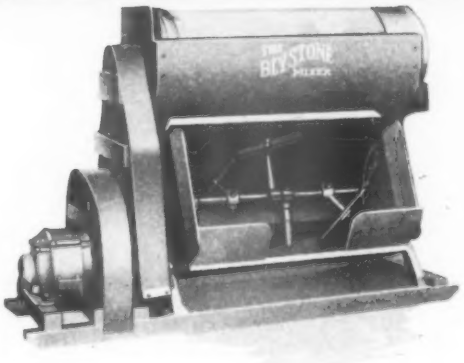

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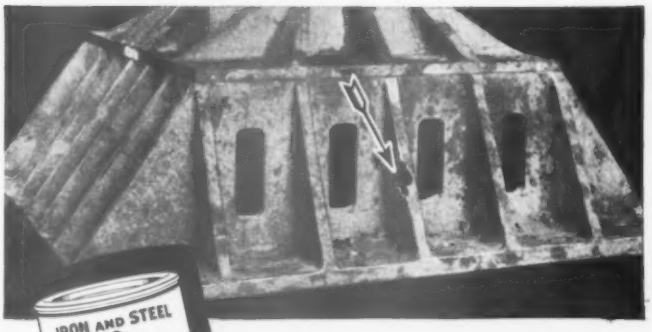

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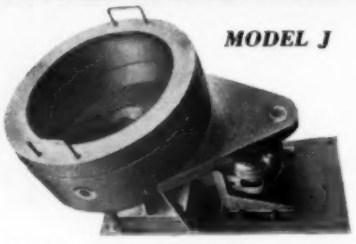

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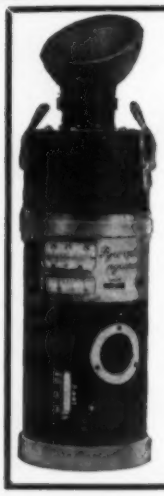

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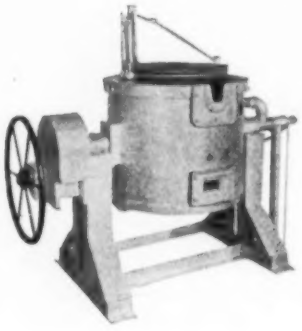

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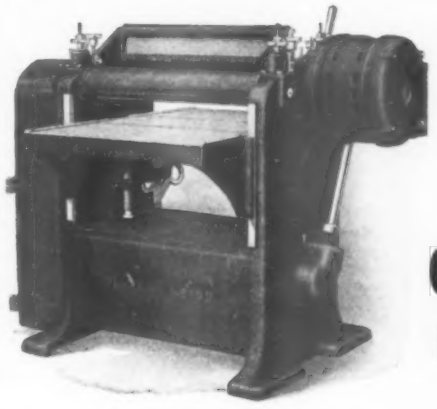

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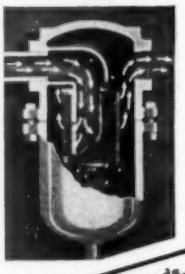

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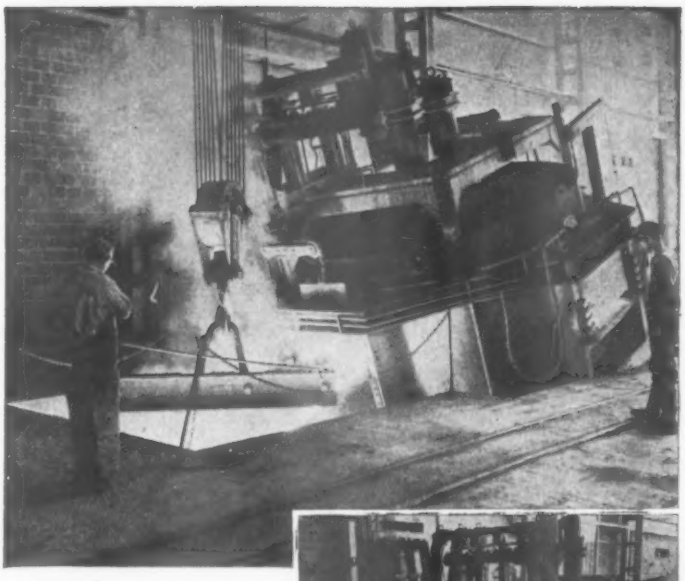

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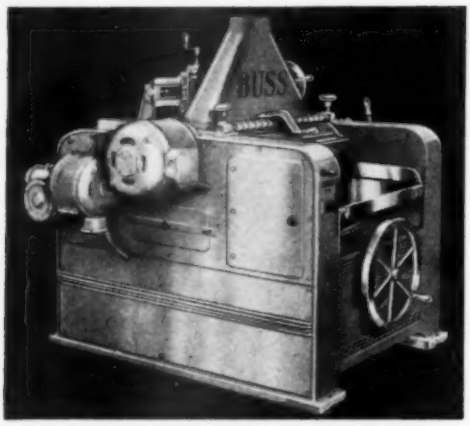

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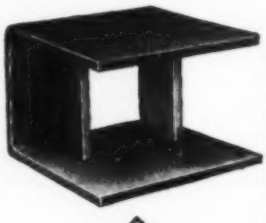

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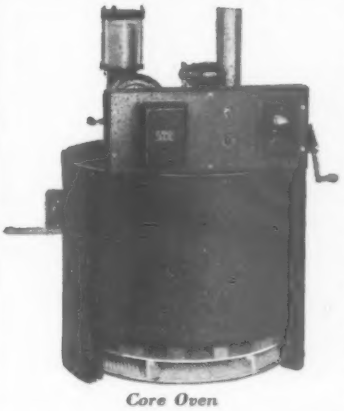

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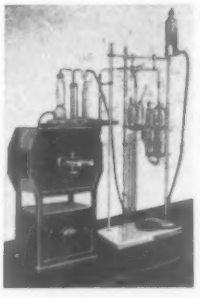

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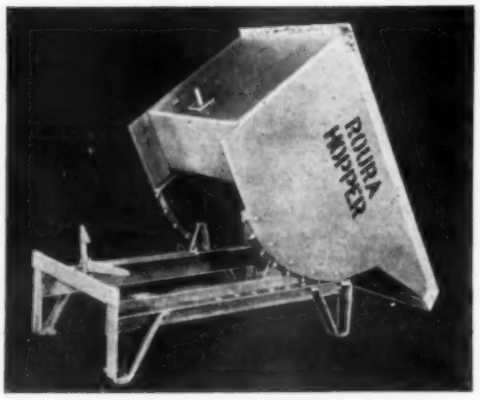

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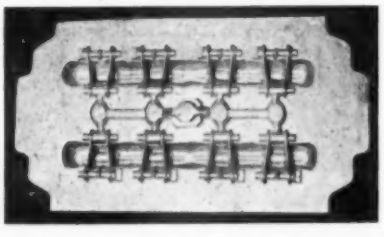

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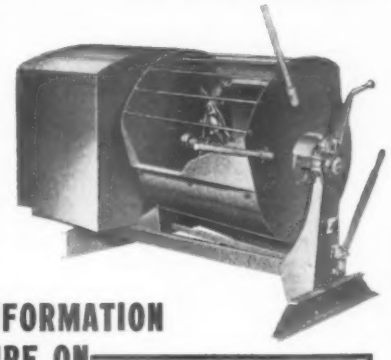

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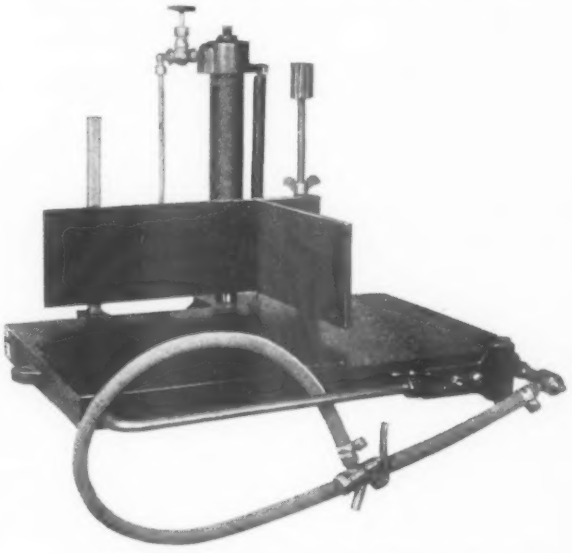

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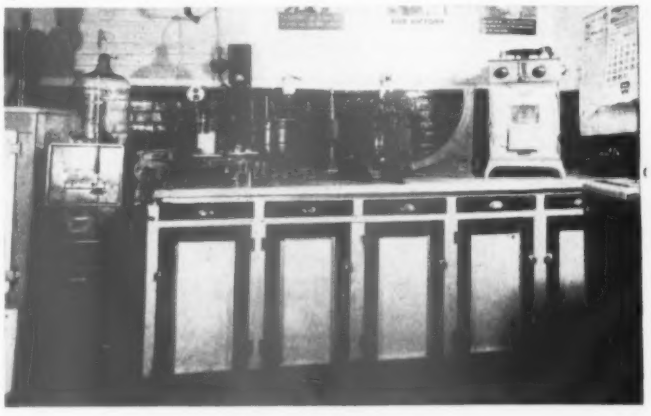

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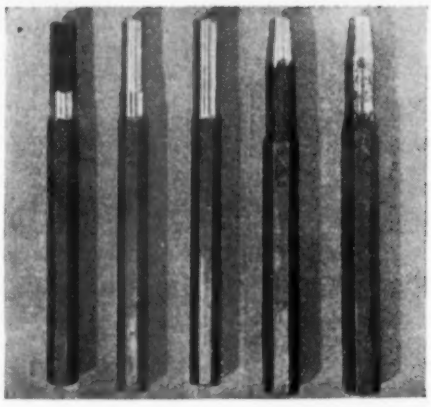

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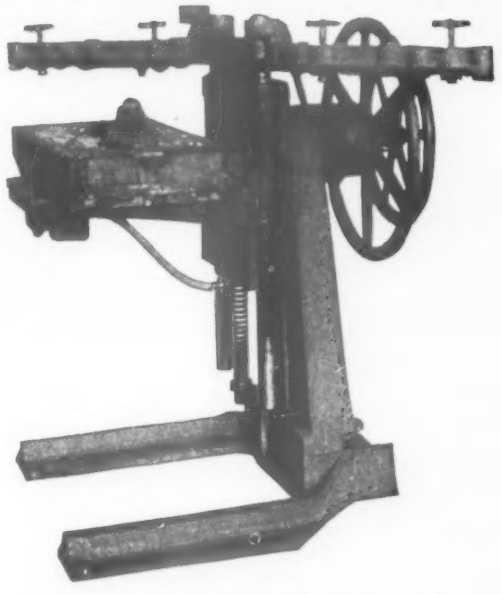

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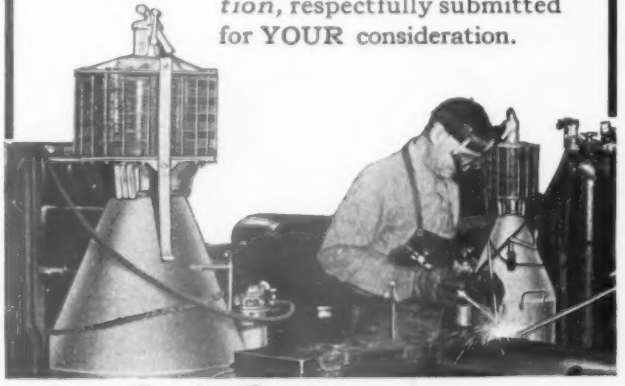

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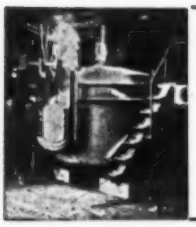

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Schneible Co., Claude B., 2827—25th St., Detroit, Mich.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland, Ohio.
B. F. Sturtevant Co., Hyde Park, Boston, Mass.

VENTS (Core Box)
Wm. Demmler & Bros., Kewanee, Ill.,
C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.

VIBRATORS
Adams Co., 700 Foster St., Dubuque, Iowa.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Cannon Vibrator Co., 1111 Power Ave., Cleveland, O.
Davenport Machine & Foundry Co., Davenport, Iowa.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago, Ill.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.
Wm. H. Nicholls Co., Richmond Hill, Long Island, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis St., Philadelphia, Pa.
S P O Incorporated, 7500 Grand Division Ave., Cleveland, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia, Pa.

VIBRATORS (Core Bench)
New Haven Vibrator Co., 131 Chestnut St., New Haven, Conn.

WAX (Core, Vent, Pattern)
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
United Compound Co., Inc., 328 South Park Ave., Buffalo, N. Y.

WEDGES (Foundry)
Chicago Mfg. & Distributing Co., 1929 W 46th St., Chicago, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

WEIGHING DEVICES
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.

WELDING GAS
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

WELDING (Acetylene Generators)
Sight Feed Generator Co., Richmond, Ind.

WELDING APPARATUS (Electric Arc)
Sight Feed Generator Co., Richmond, Ind.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Liquid Carbonic Corp., 3110 S. Kedzie Ave., Chicago, Ill.

WELDING ROD
Air Reduction Sales Co., 60 East 42nd St., New York, N. Y.
Eutectic Welding Alloys Inc., 40 Worth St., New York City.
Stoody Co., 1139 W. Slauson Ave., Whittier, Calif.

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Construction Machinery Corp., Waterloo, Iowa
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WHEELBARROW WHEELS
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WHEELS (Metal)
Chase Foundry & Mfg. Co., 2300 Parsons Ave., Columbus, O.
Electric Wheel Co., Quincy, Ill.

WHEELS (Wire)
Osborn Mfg. Co. 5401 Hamilton Ave., Cleveland, O.

WIRE BRUSHES
Osborn Mfg. Co. 5401 Hamilton Ave., Cleveland, O.

WIRE CLOTH
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.

WOODWORKING MACHINERY
Delta Mfg. Co., Industrial division 620 E. Vienna Ave., Milwaukee, Wis.
Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway Toledo, Ohio.
Kindt-Collins Co., 12653 Elmwood Ave., Cleveland, O.
Oliver Machinery Co., Grand Rapids, Mich.

X-RAY EQUIPMENT
General Electric X-Ray Corp., Dept. N 37, 2012 Jackson Blvd., Chicago, Ill.
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

X-RAY FILMS
Picker X-Ray Corp., 300 Fourth Ave., New York City.

X-RAY INSPECTION
Kelley-Koett Mfg. Co., 212 W. 4th St., Covington, Ky.
Magnaflux Corporation, 5910 Northwest Highway, Chicago, Ill.
Picker X-Ray Corp., 300 Fourth Ave., New York, N. Y.

ZINC
American Smelting & Refining Co., 120 Broadway, New York

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Gasweld MOULD DRYING TORCH

Dries Large Areas Quickly

● "Gasweld" Torches provide a large bushy flame that covers large areas and gets into hard-to-reach corners.

Weighing only 3½ lbs. these torches use natural or city gas, operating efficiently on pressures as low as 4 ounces. Ruggedly constructed, well balanced and easy to handle, "Gasweld" torches bring to the foundry a new idea of convenience, efficiency and safety, eliminating entirely the old fashioned, cumbersome methods of mould drying.

Write today for full details and "Gasweld" catalog.

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Manufacturers of Oxygen and Acetylene and the "Gasweld" line of Welding and Cutting Apparatus

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■ We manufacture the only complete line of dressers and cutters. Write for copy of catalog "F" and name of your nearest dealer.

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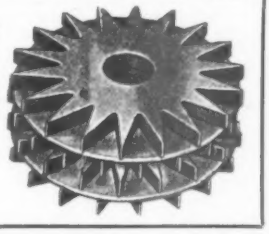
Urbana, Ohio

Canadian D. S. Mfg. Co., Hamilton, Ont.



CORE WIRE

STRAIGHTENED AND CUT TO SIZE

Write for Descriptive Circular

PROGRESSIVE CORE WIRE CO.

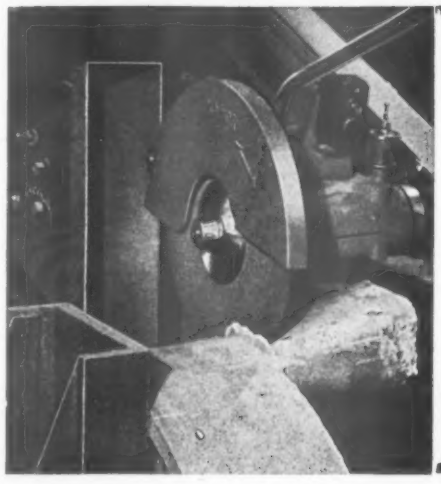
1025 Bronson Court S. E. Cleveland 15, Ohio

WILLIAMS "HOOK-ON" SINGLE LINE BUCKET

The Williams "Hook-on" Single Line Bucket is designed especially for foundry service in ⅜ to 2 cubic yard capacities. Its many features of design and construction are described in an illustrated bulletin sent free on request. Write

SPECIAL TYPE *for* FOUNDRY SERVICE

THE WELLMAN ENGINEERING CO. • CLEVELAND, OHIO



WEST CUT-OFF WHEELS

The only wheel developed especially for the cutting of gates and risers

THERE IS A WEST WHEEL FOR EVERY NONFERROUS, STEEL OR IRON CUTTING JOB

THE WEST COMPANY

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Classified Advertising

Help Wanted

MAGNESIUM FOUNDRY SUPERINTENDENT
Ohio manufacturer of Magnesium Sand Castings for Aircraft has an immediate opening for an experienced magnesium or nonferrous Foundry Superintendent. Good salary. Reply stating age and experience. Replies will be held in strict confidence. Our organization knows of this advertisement.

BOX 300

The FOUNDRY -:- CLEVELAND

GENERAL

SUPERINTENDENT

Man of considerable experience wanted, capable of assuming full charge of small to medium sized well equipped machine shop and foundry. Heavy castings subject to Navy inspection; small castings for Maritime Commission. Salary commensurate with responsibility, plus bonus arrangement.

Box 321

The FOUNDRY Cleveland, Ohio

Statement of availability and USES consent needed.

FOUNDRY SUPERINTENDENT
Require man experienced in production methods for well-equipped modern aluminum foundry. Experience in aluminum is not necessary but your ability to handle men and equipment is most important.
Permant position with bright future.

ALUMINUM ALLOYS CORPORATION
7447 ST. AUBIN ST. DETROIT 12, MICH.

SALESMAN
With some metallurgical and practical cupola melting experience preferred, to sell gray iron foundry necessity for firm 50 years leader in its field. Salary basis; permanent position, not affected by post-war conditions. Give full information as to age, family status, experience, education and references in first letter. Address: Box 261, The FOUNDRY, Cleveland.

IRON FOUNDRY METALLURGIST
Wanted Iron Foundry Metallurgist for large jobbing foundry in Los Angeles. Must be thoroughly experienced in cupola operations. Write giving education, experience, salary desired, photograph if possible and other complete information. Address: Box 267, The FOUNDRY, Cleveland.

CORE WASH SALESMAN
Alive salesman with contacts; can assure himself of a happy connection in Ohio and Western Pennsylvania. What are your qualifications. Address: Box 314, The FOUNDRY, Cleveland.

WORKS MANAGER
For established electric steel foundry, producing 500 tons of small and medium size castings per month. Plant located in central west. Excellent opportunity. Write, giving full experience, qualifications, etc. Address: Box 293, The FOUNDRY, Cleveland.

WANTED
Chemist capable of analyzing and testing metals. Advise salary desired. Address: Box 295, The FOUNDRY, Cleveland.

Help Wanted

FOUNDRY FOREMAN
By a large Chicago Gray Iron jobbing production Foundry, handling light and medium castings, largely on squeezer and molding machines. State in your reply your age, experience fully, draft and family status, also salary expected. All applications confidential. Unusual opportunity for man who has been successful in obtaining maximum production. Address: Box 185, The FOUNDRY, Cleveland.

ATTENTION SALESMEN!
Representatives now calling on foundries regularly are wanted by a well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland.

BRASS SHOP FOREMAN
IN NORTHWEST STATE WANT A WORKING FOREMAN FOR BRASS SHOP EMPLOYING 6 MEN; MAN TO UNDERSTAND MOULDING AND MIXTURES FOR GENERAL RAILROAD BRASS CASTINGS. PERMANENT POSITION. STATE AGE, QUALIFICATIONS, SALARY AND WHEN AVAILABLE TO START WORK. ADDRESS: BOX 301, THE FOUNDRY, CLEVELAND.

FOREMEN
Have position open for three men of high quality foreman in Cleaning Room, Foreman in Core Room, and Chief Inspector. Large gray iron foundry. Must be high quality men. Give qualifications in reply. Address: Box 307, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN
Malleable iron foundry of New York State has an excellent opening for a competent foundry foreman. One who has had several years' experience in gating and general malleable foundry practice. Address: Box 297, The FOUNDRY, Cleveland.

PERMANENT MOLD ENGINEER
Established foundry organization seeking services of permanent mold man experienced in nonferrous field. Location Chicago area with good post war prospects. Address: Box 308, The FOUNDRY, Cleveland.

PATTERN SUPERINTENDENT
Experienced man to take complete charge of pattern shop of 15 to 20 in large Malleable Iron Foundry, located in Michigan area. Address: Box 270, The FOUNDRY, Cleveland.

WANTED
Open hearth operators Brass and Aluminum. Middle West, state references in first letter. Permanent 100% War Work. Address: Box 209, The FOUNDRY, Cleveland.

WANTED
Competent metallurgist, one who is experienced in Malleable Iron industry. Familiar with synthetic sand control with knowledge of pulverized coal annealing. Excellent opportunity for right party by an old established New York State foundry. Address: Box 296, The FOUNDRY, Cleveland.

WANTED
Experienced Brass Foundry Foreman. Please state experience and references. Address: Box 294, The FOUNDRY, Cleveland.

WANTED
Estimator for Grey Iron Castings and machine work, familiar with costs large and small castings, core work, etc. Location, Pittsburgh District. State qualifications. Address: Box 306, The FOUNDRY, Cleveland.

WANTED
Steel and gray iron molders
Union shop
N. & S. FOUNDRY COMPANY,
SEATTLE, WASH.

FOUNDRY ENGINEER
To look after the care and maintenance of machinery and equipment. Must be a practical man, thoroughly experienced in all important measures and precautions necessary to get the maximum life out of machinery and tools in a highly mechanized Foundry. To such this position offers a broad opportunity. In confidence, wire past experience fully, age, basic and technical education, draft status and starting salary. Address: Box 188, The FOUNDRY, Cleveland.

Help Wanted

ENGINEER WITH FOUNDRY—MACHINE TOOL EXPERIENCE
Post war opportunity; permanent position for energetic, progressive engineer with pleasing personality and faculty for leading men in getting work accomplished. Company with several plants located in western Pennsylvania is long established and progressive. Position will lead to plant production managerial work.
Write giving full details of current and past experience, salaries, education, age, marital status, etc. Address: Box 235, The FOUNDRY, Cleveland.

MAGNESIUM PRODUCTION SUPERINTENDENT
Southern California magnesium foundry requires production superintendent to take full charge of sand and permanent mold. Position immediately. Address: Box 324, The FOUNDRY, Cleveland.

Positions Wanted

EXECUTIVE ASSISTANT
Jobbing foundry manager and former office manager wants connection with progressive company. Familiar with all phases of production of light and medium weight castings, job cost accounting, scheduling, gray iron metallurgy including processed and alloyed irons, job estimating and selling. Present connection as jobbing foundry manager terminated due to change of policy regarding jobbing work in captive foundry. Has good record and excellent references. Address: Box 298, The FOUNDRY, Cleveland.

NON-FERROUS METALLURGIST
EXPERIENCED IN SMELTING BRASS, ALUMINUM, AND OTHER NON-FERROUS METALS, ALSO FOUNDRY EXPERIENCE, CAPABLE OF ACTING AS FOUNDRY CONSULTANT OR PLANT METALLURGIST IN NON-FERROUS SMELTER. PRESENT POSITION DOES NOT UTILIZE EXPERIENCE. ADDRESS: BOX 292, The FOUNDRY, CLEVELAND.

FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN
Thirty years' foundry experience of which has been superintendent and general foreman for twenty years on jobbing machinery, castings and practical foundryman in every detail. New Jersey preferred. Best reference. Address: Box 323, The FOUNDRY, Cleveland.

MECHANICAL ENGINEER
Age 49. Specialized permanent moulding—centrifugal, pressure and vacuum casting of aluminum bronzes, bearing bronzes. Full knowledge die design, machines for process. Practical experience wood, metal patternmaking, toolmaking, tool-jig fixture design, also sales engineering experience. Desires connection with concern having postwar projects. Northwestern Pennsylvania or Northeastern Illinois. Address: Box 318, The FOUNDRY, Cleveland.

GENERAL MANAGER
MATURE, CAPABLE, AGGRESSIVE, DEPENDABLE
with a record that assures you that he can and will manage your business energetically and safely and develop its possibilities fully and profitably. Broad experience in foundry, machinery and allied lines. General management established medium-size business primary objective. Correspondence in confidence. Address: Box 247, The FOUNDRY, Cleveland.

FOUNDRY MANAGER OR SUPERINTENDENT
Thorough experience in production and executive capacity producing quality castings. Light, medium and heavy. Green and dry sand. Good rigger for production on jobbing work. Thoroughly experienced in cupola operation. Well versed in grey iron metallurgy and foundry costs. Thorough on molding and coremaking. Call on the trade. Practical in every detail. Middle age and out of the draft. Address: Box 311, The FOUNDRY, Cleveland.

OPEN HEARTH SUPERINTENDENT
Basic or acid bottom. Can make rolls. Thirty-five years of varied experience. Address: Box 313, The FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

FOUNDRY SUPERINTENDENT

Fully experienced in nonferrous metals—light, medium and heavy castings. Rigging, gating, cost estimating, blue print reading and core room production. Neat appearing and aggressive. Age 42. Thorough experience as foundry superintendent. Experience including steam valve high pressure casting aluminum, brass bronze, nickel, copper, aluminum bronze, silicon bronze and high manganese bronze casting. Employed. Address: Box 286, The FOUNDRY, Cleveland.

PATTERN SHOP SUPERVISOR

Desires position as contact man between pattern shop, foundry, engineering, and machine shop operations. Fifteen years general foundry experience including foundry engineering and machine shop inspection. Age 38. Address: Box 322, The FOUNDRY, Cleveland.

STEEL FOUNDRY MANAGER OR SUPERINTENDENT

Practical and technical. At present employed, but will be available the first of the year. Thirty years as foreman, superintendent and manager. Know heat treating and practical metallurgy. Am interested only in position where I can take complete charge of all foundry operations. Know how to handle men and good producer. Best of references. Address: Box 319, The FOUNDRY, Cleveland.

METALLURGIST—MELTING SUPERINTENDENT

FIFTEEN YEARS' EXPERIENCE PRODUCING ACID ELECTRIC STEELS INCLUDING HIGH ALLOY STEELS. AGE 37, MARRIED, DRAFT EXEMPT AND AT PRESENT EMPLOYED. ADDRESS: BOX 287, The FOUNDRY, CLEVELAND.

FOUNDRY FOREMAN

With 29 years' practical experience as a molder and foreman in light and medium gray iron foundry. Also practical experience in aluminum foundry. Forty-seven years old. Prefer Northeastern Ohio. Available around January 1. Address: Box 276, The FOUNDRY, Cleveland.

PLANT SUPERINTENDENT

Well versed in the production of ferrous and nonferrous castings desires a connection in the South or Southwest. Successful record with some of the larger producers. Responsibly employed at present but desires better health conditions for one of the members of family. For complete details address: Box 234, The FOUNDRY, Cleveland.

NONFERROUS FOUNDRY FOREMAN

Broad practical experience including steam valves, high pressure castings, chilled castings and general jobbing and production work. Prefer Position with manufacturing plant. Address: Box 160, The FOUNDRY, Cleveland.

FOUNDRY MASTER MECHANIC

Twenty years of practical, mechanical, electrical and foundry construction experience in supervisory capacity. Forty-nine years of age. Address: Box 264, The FOUNDRY, Cleveland.

MAGNESIUM FOUNDRY SUPERINTENDENT

Three years' experience in establishing, controlling and supervising quantity production of aircraft magnesium castings. College graduate —metallurgical engineer. Five years' practical foundry experience. Wide knowledge of mass production equipment, newest magnesium foundry methods, sands, inhibitors, laboratory test methods and cost estimating. Good trouble shooter. Capable of taking complete charge of foundry and laboratory. Open for position on salary and percentage based on tonnage. Address: Box 310, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Age 53, employed. Expert on bronze, light and medium steel castings. Practical molder, coremaker and electric furnace operator, know gating, heading and rigging. Can handle help. Address: Box 317, The FOUNDRY, Cleveland.

Positions Wanted

PLANT MANAGER OR SUPERINTENDENT

Married, thirty-nine years of age, wife and two children, desires position with post war possibilities. Has background of twenty years' experience in gray iron. Well versed in all phases of the business both green and dry sand work. Can furnish excellent references. Prefer locating in New York, Ohio or Indiana. Address: Box 304, The FOUNDRY, Cleveland.

BRASS FOUNDRY FOREMAN

A-1 on Brass, Bronze and Aluminum jobbing and production. Middle West preferred. Address: Box 312, The FOUNDRY, Cleveland.

Opportunities

DO YOU WANT ORDERS?

Qualified salesman in Detroit will secure profitable castings orders for you. Standard commission. All metals.

Box 315

The FOUNDRY -:- Cleveland

FOUNDRY SMALL TOWN NEAR CLEVELAND

Five ton cupola; fully equipped building 40 x 50; finishing room 14 x 20; no competition; ample work; rent $50; sacrifice $6,000; rare opportunity.

APPLE COMPANY BROKERS, CLEVELAND, OHIO

Wanted-To-Buy

WANTED

Second-hand Wheelabrator. Address: Box 281, The FOUNDRY, Cleveland.

WANTED

AA size 62-52" cutting cylinder 4 Cylinder Gas Engine Sand Cutter. Address: Box 316, The FOUNDRY, Cleveland, Ohio.

WANTED

Two No. 333 Osborn Jolt Roll-over Squeeze pattern draw molding machines with swing-out table.

Two No. 433 Osborn Jolt roll-over Squeeze pattern draw molding machines with swing out table.

Frank Foundries Corp. **Moline, Ill.**

WANTED TO BUY

One used Whiting Easy-pour, de-sulphurizing ladle, capacity four to six-thousand pounds when lined. Address: Atlas Foundry Company, Marion, Indiana.

WANTED

24-inch Davenport Power Jolt Rollover Machine. State condition, age, price, etc. Address: **Keen Foundry Company, Griffith, Indiana.**

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

Foundries for Sale

MALLEABLE FOUNDRY

Old established, now producing over 100 tons per month. Full machine operation. Twenty-two molders. Located Central New York, non-union, good labor conditions. Experienced management can remain. Plant and machinery good condition. Opportunity for either captive production or excellent profit operation. Good tax base. Address: Box 302, The FOUNDRY, Cleveland.

Foundries for Sale

FOR SALE

Gray Iron Foundry, situated North Central Ohio, fully equipped for jobbing. Established 23 years, regular customers, full working crew of moulders and laborers.

Box 305

The FOUNDRY -:- Cleveland, O.

FOR SALE

Stove Foundry 50 molder size fully equipped, located in Central West. Address: Box 278, The FOUNDRY, Cleveland.

Employment Service

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.

1010 Public Square Building **Cleveland, Ohio**

SALARIED POSITIONS

This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details.

R. W. BIXBY INC.

101 Delward Bldg. **Buffalo, N. Y.**

Foundry Service

Aluminum Bronze, Hi-Tensile Manganese Bronze, Silicon Bronze, Nickel Bronze Castings.

"We can produce clean, solid, sand-blasted bronze castings made to any specification without peening, welding, soldering or brazing!"

BOX 325

The FOUNDRY **CLEVELAND, OHIO**

For Sale

FOR SALE

Six Tabor power squeezers in good condition, $75.00 each. Immediate shipment. Address: **Keen Foundry Company, Griffith, Indiana.**

FOR SALE

1 Roots Connersville Blower. Size 15 x 42 13 ft. per revolution capacity. Good condition. Price reasonable. Address: Box 299, The FOUNDRY, Cleveland.

TANKS

from Tank Cars—Large quantity
8,000 gallon—10,000 gallon
Built for 60 lbs. Hydrostatic and
25 lbs. Air Tests.

CLEANED — TESTED — PAINTED

Special Notice

What would PORTABLE storage of your Liquids save you? Ask our proposition on WHOLE CARS!

Also TANKS, Commercial

Vertical and Horizontal. From 2879 to 12,500 gals. and even much larger.

IRON & STEEL PRODUCTS, INC.

38 years' experience

13444 S. Brainard Ave. **Chicago 33, Illinois**

"ANYTHING containing IRON or STEEL"

Classified Advertising

For Sale

SPECIAL DEFENSE BARGAINS

Cast Iron and Steel Plate Mill-Dust & Shavings Exhausters 50 in stock. **Cupola and Furnace** Blowers for Coke, Oil or Gas Combustion.
1—Spencer blower 3600 CFM @ 1½ lbs.—40 h.p. motor.
1—Spencer blower 2250 CFM @ 1½ lbs.—25 h.p. motor.
2—Sprague 4 Ton Electric Hoists 115 V.—D.C.
1—Sprague 2 Ton Electric Hoist 115 V.—D.C.
Brass Furnaces: No. 2 Class A 42" Schwartz.
2—Monarch-Rockwell's No. 2—each 500 lbs. capacity.
2—Hausfeld, non-crucible with Blowers—each 400 lbs.
1—Stationary for up to No. 70 crucible.
1—Booth Electric Furnace with accessories 725 lbs. cap., with new unused extra lining.
Can furnish stationary furnaces on short notice for crucibles No. 60 to No. 125 with swing top covers.
Molding Machines:
1—Type F International 26" x 36" platen air jolt roll over eight inch draw stationary molding machine.
1—Battenfeld stationary jolt—squeeze—lift 17" x 22" table, 1—jolt squeeze 17" x 22".
1—Tabor plain jolt table No. B-18—54" x 96".
Tumbling Mills—2 cast iron for brass cleaning.
1—Sly 48" x 60"—1" thick round steel shell.
Core Oven, Buckeye, Semi-circular portable 3-7" and 2-11" shelves. One Burton portable 4-6" shelves gas fired.
1—Core Sand Mixer (dough Mixer type) 3 cu. ft. cap. Tilting trough, geared motor drive, highly efficient, also one 4' capacity.
Compressors:
1—Chicago 7½" x 6" 106' capacity, 100 lbs.
1—Chicago 12" x 8" 240' cap., 70 lbs.
1—Worthington Feather Valve 150' cap., 100 lbs.
1—Sullivan 5½" x 5" Twin Vertical, 110' cap.

CLIFTON MACHINERY CO.
1023 W. 6TH, CINCINNATI 3, OHIO

REBUILT

BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder end dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY

406 N. Peoria St. Chicago, Ill.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

Number 2-6' Pan Simpson Mixer including Motor (220-2-60) and gearing with aerator. All in fair second-hand condition. Immediate delivery. One Thousand Dollars Eastern Pennsylvania.

BOX 303

The FOUNDRY CLEVELAND

FOR SALE

Ingersoll-Rand Air Compressor, Type XB-2, Size 19 and 12 x 16, Serial 33981 and 2, 750 CFM at 100 PSI and 170 RPM. Complete with intercooler, unloader, flat belt drive, G. E. 150 H.P. induction motor wired for 220 V/3 phase/60 cycle, G. E. drum type controller. Can be seen in operation till about December 15th, and is available as is. Write: Box 309, The FOUNDRY, Cleveland.

FOR SALE

Two—(2) Fisher Type AMS Aluminum Oil Fired crucible melting furnaces, lined to accommodate a No. 2375 Tercod crucible; furnace supplied with flue to permit change over to flue-type, if required; complete with fuel oil burner for use with No. 5 fuel oil and 20-ounce air pressure.

William F. Jobbins, Inc.
P. O. Box 230 -:- Aurora, Ill.

For Sale

WORLD'S FAIR LIGHTS

Mercury quartz arc lights—400 watt, 220 volt AC complete with base, socket, reflector; Bulb approximately 2 x 8 inches, each.....$16
Mazda spot lights, 1500 watt, complete, each $9
½ inch Electric celluloid valves, 13 lbs. bronze, normally closed; price $12
1¼ inch valve as above, 40 lb. each $25

BROWN'S 144-15 20th AVE.
WHITESTONE LONG ISLAND

FOR SALE

1—International type "JS" Jolt Squeezer.
2—International type "M" Jolt Rollovers.
1—26 x 12 type "F" Rollover.
3—Core Drying Ovens, drawer type, either gas, coke or oil fired.
A-1 condition. Illustrations can be sent.

Box 320
The FOUNDRY -:- Cleveland

FOR SALE

One tractor type sandslinger. 11'-8" high overall. 16" head with hinged cover. Used but completely overhauled and in good working condition. Also, one Sturtevant No. 9 pressure blower with 50 HP—220 Volt—3 phase Wagner motor. Address: DIAMOND IRON WORKS INC., 1709 NO. 2nd STREET, MINNEAPOLIS 11, MINNESOTA.

FOR SALE

Type G. J. Pangborn Rotoblast complete with loader and motors; Max. capacity 16 cu. ft. Max. 2200 lbs. 8 ft. x 13 ft. x 16½ ft. high; A-1 condition. Address: Box 183, The FOUNDRY, Cleveland.

FOR SALE

1—"Dings" Magnetic Separator No. 579.
1—Stoney Shakeout.
1—6421-810 recording thermometer control one contact.
(A) Chart No. 1729 grad. 50-1000° F.
(B) 17355-950 bulb with 17374-75 neck and 13412-2 tubing.
(C) Motor 110V. 60 cycle instru. Serial No. 94905 including charts—ink—mtng accessories and instructions.
18—10' 0" long frames.
2—5' 0" long frames.
26—6" long x 2 7/16" diameter. Dust-proof ball bearing rollers.
2—5' 0" section roller gravity conveyors.
18—10' 0" section roller gravity conveyors.
26—16"—2 7/16" diameter No. 10-D dust protected rolls.
16—10' 0" sections roller gravity conveyor 2 7/16" diameter No. 10-D dust protected rolls 16" long—6" centers type No. 2.
1—Type 592T—Timken worm geared crane ladle with V ball and riveted steel trunnions—4500 lb. capacity.
2—No. 120 DH Double type Herringbone Speed Reducer Serial "B" Style No. 1 Assembly No. 9. 2 CI bases for above. 2—1¼ AA flex couplings.
1—No. 105-DH double type Herringbone Speed Reducer Serial "B" Style No. 1—Assembly No. 9.
1—No. 90-DH double type Herringbone Speed Reducer Serial "B" Style No. 1—Assembly No. 9.
1—CI base for 90 DH Reducer.
1—1¼ AA flex coupling.
1—CI base for 105 DH Reducer.
1—1¼ AA flex coupling.
3—2 ton capacity type LR-2 catalog No. 370—Shaw Box Load Lifter Electric Hoists, Lug Suspension—Lift 18'—28 FPM, single speed, 4 HP motor, push button control for 220-3-60 current.
1—International Core machine type AN. Almost as good as new.
1—Herman 6000 lb. jolt rollover with air clamps for flask.
Tumbling mill—71" diam. x 48" long—11/16" cover.

THE E. H. BARDES RANGE AND FOUNDRY COMPANY
2619 COLERAIN AVE., CINCINNATI, OHIO

For Sale

REBUILT EQUIPMENT IN STOCK

IMMEDIATE SHIPMENT

MISCELLANEOUS ITEMS

(1)—No. 60 Fisher stationary crucible Furnace, oil fired, new lining.
(1)—3-ton geared crane type Ladle.
(2)—1¾" Power Sprue Cutters.
(3)—Branford Shakeout Vibrators.
(1)—275-J Osborn Jolt Squeezer.
(1)—10" Tabor Post Type Squeezer.
(2)—1½-yd. Hayward 230-VDC. Elec. Buckets.
(1)—1½ yd. single Line Brosius Bucket.

ELECTRIC MONORAIL HOISTS

(2)—2 ton Northern 220-VAC.
(2)—1-ton Euclid, 1-motor, 110/230-VDC.
(1)—1 ton, 2 motor Cleveland Tramrail, 230-VDC. cage operated.
(1)—5-ton, 2 motor, Shepard, 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

	Tons	Make	Span	Current
(1)	5	P & H	50'0"	A.C. or D.C.
(1)	10	Whiting	32'0"	220/3/60-cy.
(1)	10	American	54'1½"	230-VDC
(1)	10	Morgan	58'2"	230-VDC
(1)	75/25	Morgan	59'0"	230-VDC

Our large modern plant is equipped to rebuild any of these cranes to suit your requirements. Send us your motor inquiries, we have a large stock of Crane, Mill & General Purpose Motors.

T. B. MacCABE CO.
4304 Clarissa St. PHILADELPHIA 40, PA.

COMPRESSORS AND BLOWERS

2100 cfm @ 12 oz. Gen. Elec. Centrifugal compressor with 10 HP 2-60-3450 RPM motor.
2—1200 cfm @ 11 oz. Buffalo Pressure Blowers, 9¼" intake 7" x 7¼" outlet, with 7½ HP 3-60-1800 RPM motors.

SAND VIBRATOR

7 to 8 ton per hours, Jeffery-Traylor with vibrator M.G. set. Write, wire or phone.

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE., CLEVELAND 14, OHIO

FOR SALE

1—Used Single phase Electric Steel Furnace complete with transformers, 12,000 volt primary. Automatic Electrode Control etc. Purchased new May 1942. Has been producing 7 tons daily. Can make shipment within 3 days. Price F.O.B. shipping point $5500. Address: Box 161, The FOUNDRY, Cleveland.

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEEL TANKS

9—5000 gal., 11,500 and 18,000 gal. cap.
17—1000 bbl., 4000 bbl. and 10,000 bbl. cap.

TANKS BOUGHT AND SOLD

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

FOR SALE

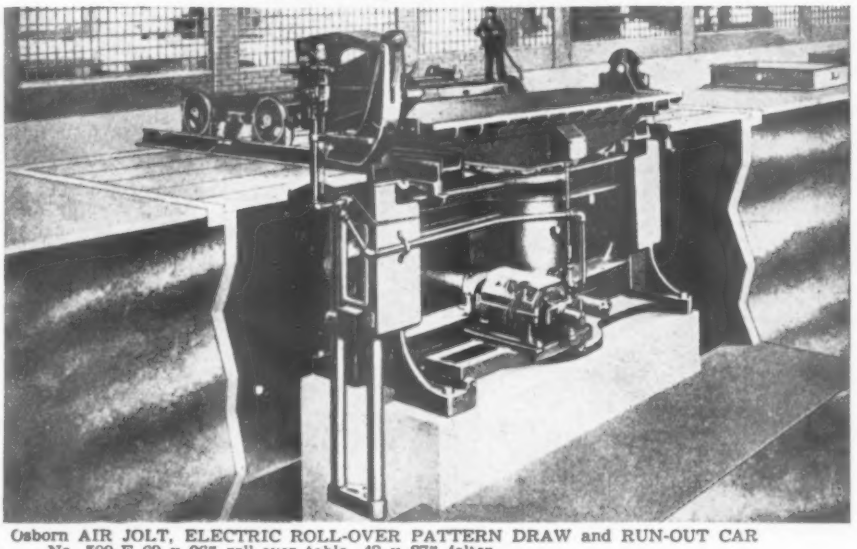
1 Dings Magnetic Separator with Fidelity Motor Generator Set. DC Generator, 400 watts, 110 volt, 1750 RPM. One HP Motor, 220 v. 2 ph. 60 cycle. Both items in excellent condition. Practically new.

THE E. T. FRAIM LOCK CO.
LANCASTER -:- PENNSYLVANIA

SCULLY Reconditioned Foundry Equipment

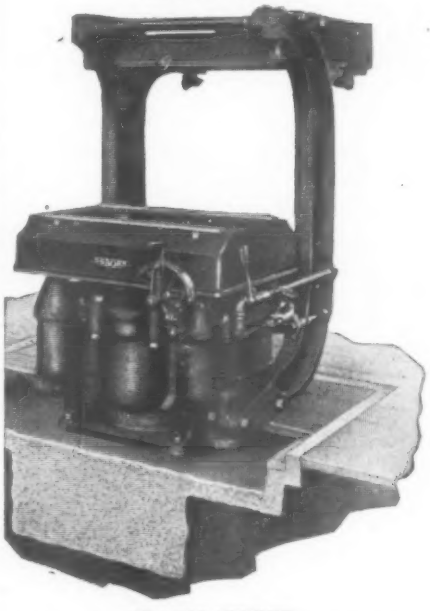
★ ALL SCULLY EQUIPMENT IS REBUILT AND OVERHAULED IN OUR OWN, NEW MACHINE SHOP

OSBORN MOLDING MACHINE



Osborn AIR JOLT, ELECTRIC ROLL-OVER PATTERN DRAW and RUN-OUT CAR
No. 509-E 60 x 96" roll-over table, 42 x 87" jolter.
No. 513-E 36 x 124" roll-over table, 36 x 112" jolter.

OSBORN JOLT SQUEEZE & POWER STRIP



No. 703 OSBORN
(Similar to above excepting with roll-off)

No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary. Length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolting cap. @ 80 lbs. press. Distance from lifting frame to squeeze head 24¼", flask length 44½" with roll-off conveyor.

No. 703-5 Osborn, same as above, excepting 17 x 35" table.

PANGBORN ROTO-BLAST Barrel, comple with LOADER, AC Motors, Etc.

MOLDING MACHINES

No. 330 Arcade portable jolt roll-over squeeze, 10" draw, distance between uprights 44".

Osborn No. 332 jolt roll-over and squeeze (pit type) flask cap. max. length 36" width 26", pattern draw 9", jolt cyl. dia. 7", 750 lb. jolting cap. @ 80 lb. press., 44" between uprights.

HERMAN Independent Turn-Over and Pattern Drawing Device

(without BUMPER)

60 x 84" roll-over, 24-30" draw, 10,000-lb. series.

42 x 70" roll-over having 50" arms, 24" draw, 6000-lb. series.

MISC. MOLDING MACHINES

Pridmore power turn-over and drop, 24 x 30" electrically operated jarring machine, 2 HP 220V AC Motor.

No. 28 Davenport jolt roll-over draw, outside flask cap. 30 x 45"—12 draw, 1500 lbs. cap. @ 80 lbs.

No. 815 Johnston & Jennings jolt roll-over draw, 30 x 40" table, 15" draw—1200 lbs. cap. @ 80 lbs.

No. 34 Davenport jolt roll-over draw, outside flask cap. 36 x 54", 12" draw, 2500 lbs. cap. @ 80 lbs. press.

No. 405 Osborn jolt roll-over pattern draw, flask cap. 50 x 64"—18" draw, 3000 lbs. cap. @ 80 lbs. press. with run-out Mold Car.

PLAIN JARRING MACHINES

Tabor, 42 x 60" table, 13" dia. cyl., 7500 lbs. cap. @ 80 lbs. press.

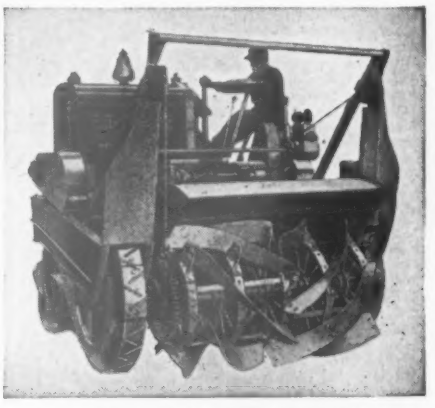
HERMAN, 60 x 72" table, 20" dia. cyl., 10,000 lbs. cap. @ 80 lbs. press.

Pangborn 6 ft. dia. TYPE EH-1 CABINET TABLE INSTALLATION, 5 ft. high partition, Abrasive Handling and Reclamation System, Belt and Bucket Type Elevator, Sandblast Pressure Tank.

AMERICAN SANDCUTTERS

Cleveland-American (similar to Model "K") 84" spiral cutting cyl., 36" dia., 92" between tractor wheels, 5" face—equipped with Cleveland 3-phase 60 cycle 220V AC Motors, Cable and Take-Up Reel.

Cleveland-American 4-motor Model F-Type 112-92, 80" cutting cyl., 8½ ft. between tractor wheels, 220V AC Motors, Cable and Reel.



American Fdry. Model "K" heavy duty type, size 72, equipped with Buda Type "WTU" 20 HP Gas Engine. 72" between tractor wheels, 6" face, having 60" cutting cyl.

CORE TURN-OVER MACHINES

International Type "R" sizes 18—20" 8 and 10" draw.

Pridmore Type "H"—16—8" drop, portable, rock-over drop.

Pridmore Type "H"—20—8" drop, portable, rock-over drop.

HAND STRIPPERS

14 x 18—6" draw, 20 x 24 x 8"
20 x 30—8" draw, 20 x 36 x 10"
22 x 24—8" draw, 22 x 28 x 8"
24 x 24—6" draw, 28 x 36 x 8"

JOLT SQUEEZE STRIPPERS

No. 142 Milwaukee, stationary, 1200-lb. cap. @ 80 lbs., 6" draw, table 19 x 35"—open end type.

No. 113 Milwaukee, open end type, portable, 500-lbs. cap. @ 80 lbs., 6" draw, 16 x 35" table.

Osborn No. 82 STRIPPING PLATE JOLT SQUEEZER, 46" between rods, 10" draw, 1200 lbs. jolting cap., 1000 lbs. stripping cap. 24 x 36" table, pin lifts 12" part one way, 36" the other.

Nicholls Type "D" stationary heavy duty JOLT SQUEEZE & PATTERN DRAW, squeeze piston 14" jolt piston 6", draw 2-6"—distance between strain rods 40" take approx. 15 x 24" flask.

MAGNETIC SCREEN SEPARATOR

Magnetic Mfg. Co. size 30" dia. x 80" long drum SCREEN MAGNETIC SEPARATOR 115 V 4.5 Amps. Type F-3, complete with shunt wound 3 HP DC 1700 RPM Motor, elevator 10'4" O/A height, 18" width, 22" depth.

60" SCHWARTZ Furnace, teapot type, oil fired, hand tilting.

SCULLY MACHINERY & EQUIPMENT CORP.

(Formerly - Foundry Division of Scully-Jones & Co.)

2031 WEST 74th STREET (Phone PROspect 8770) CHICAGO 36, ILLINOIS

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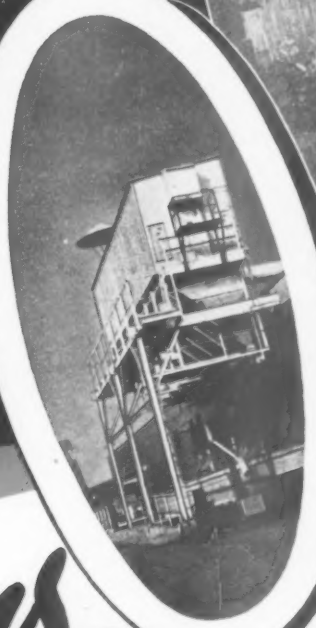
DUST
THE BREEDER OF ABSENTEEISM



Parsons OVAL BAG
DUST ARRESTORS
CHANGE the PICTURE

Statistics prove that back of most absenteeism in plants is sickness and back of most of the sickness is factory dust and dirt. • Proper dust control and that means Parsons Oval Bag dust arrestors, will instantly cure most of the present day absenteeism and along with that increase your production beyond the present peak. Parsons Oval Bag dust arrestors, modern in every respect and equipped with many exclusive features afford not only employee protection but protection for plant equipment and buildings. • For over a quarter of a century Parsons Engineering Corporation has been engineering and installing dust control systems for some of the largest plants in the world. • Why not call in a Parsons engineer to check into your dust problem, no obligation whatever. Write and we will be glad to send you a copy of our dust control bulletin "Mastery of the Air"... it's free.

PARSONS ENGINEERING CORP.

2545 EAST 79th STREET • CLEVELAND, OHIO

MODERN
ELECTRIC POURING DEVICES

Modern Electric Pouring Devices are doing a mammoth job in the war effort. Quick, easy-to-operate, they enable one man to handle a 1200 lb. ladle with dispatch.

Include these Modern products in your reduced manpower program. Modern engineers will help you adapt them to your conditions, and plan your layout.

Send for catalogue No. 143.

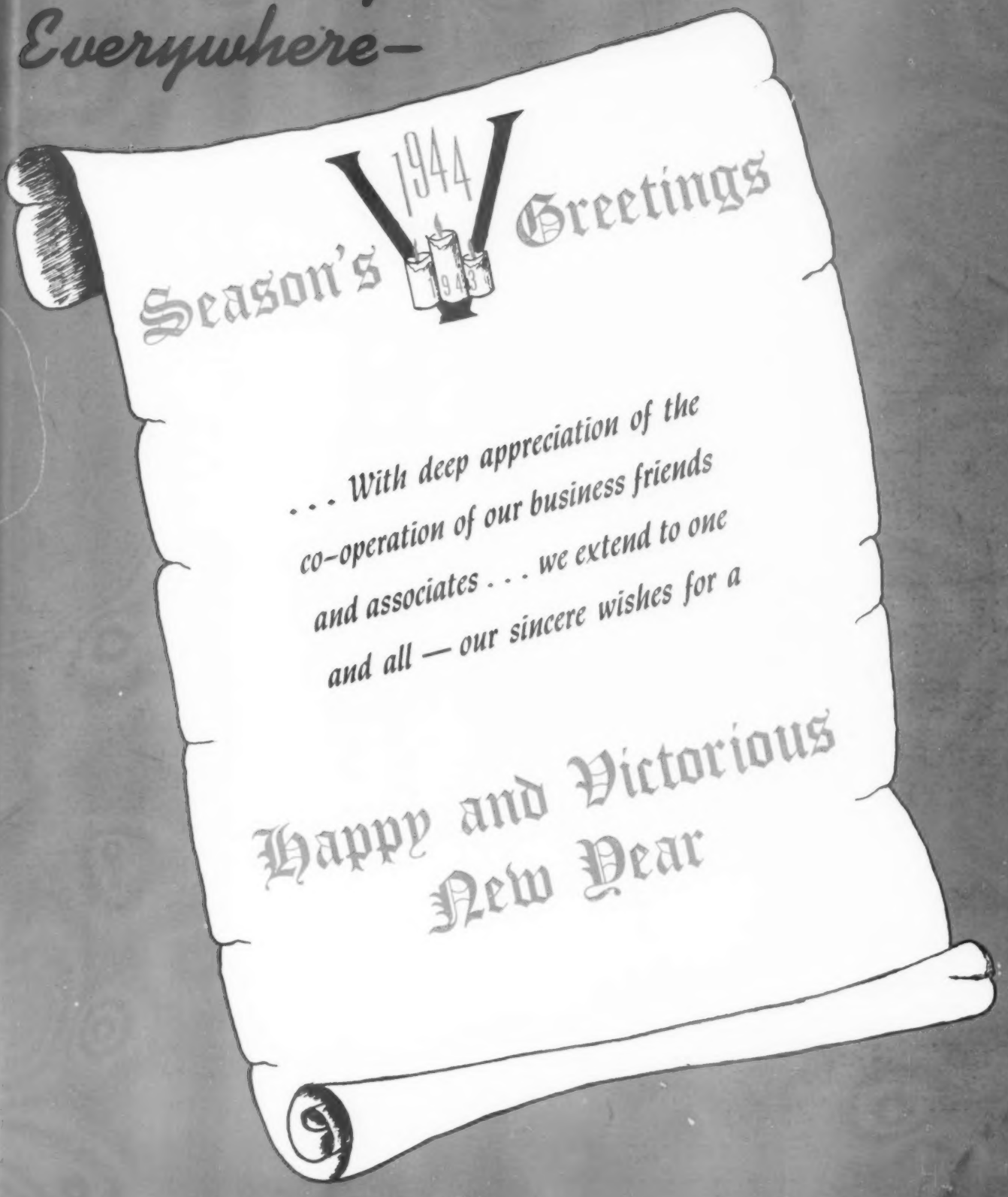
MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WISCONSIN Dept. 20

Cupolas • Cupola Chargers • Covered & Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane & Monorail Systems For Metal & Mold Handling • Furnace Charging Cranes • Electric Cranes

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.

To Foundrymen Everywhere—


Season's 1944 Greetings
. . . With deep appreciation of the co-operation of our business friends and associates . . . we extend to one and all — our sincere wishes for a
Happy and Victorious New Year

FREDERIC B. STEVENS INCORPORATED

DETROIT 26 MICHIGAN

NEW ENGLAND . . . . . 166-182 Brewery St., New Haven, Conn.
NEW YORK and PENNSYLVANIA . . . . 93 Stone St., Buffalo, N. Y.
INDIANA . . . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind

• CANADA . . . . FREDERIC B. STEVENS OF CANADA, LIMITED
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• 2368 Dundas St. West . . . . . Toronto, Ontario

TRICYCLES for TIBET!

"Via Bombay Clipper, transhipped to Lhassa by cargo plane, delivery promised by Christmas; one dozen tricycles."

* * *

WHEN a Tibetan dealer radios his order for American tricycles it will mean that incredible changes have taken place in the Central-Asian way of living. But globe-spanning flight is also spanning the ages, hastening the development of backward races, bringing the world's most primitive peoples into forcible contact with the latest inventions of western civilization.

The awakening of distant peoples to American ways! The development of global transportation by air! The wartime expansion of our productive facilities! All will stimulate a greatly increased participation in world trade by American industry! The market, the plant to supply it, and the transport system to reach it, await the word "Peace" to begin functioning on an unprecedented scale.

Profitable foreign trade will demand the utmost efficiency in production, a continuation and development of the methods and principles which have accomplished such miracles in production for war. For example, ingenious conveying systems, by regulating the flow of materials and parts, organizing and timing numerous processes and operations, are conserving materials, power and time, and greatly multiplying the productiveness of man power. Thus they become a fundamental factor in world economic development through supplying more goods to more people, because they help reduce costs and thus make possible increased consumption.

As specialists in materials-handling and power transmission systems, Link-Belt Company has aided every type of industry to secure the advantages of the latest developments in equipment and methods. We are ready to study your situation and requirements, and because we manufacture every type of conveyor, chain and mechanical power transmission equipment, our recommendations are sound and impartial. Consult Link-Belt engineers now, as a first step toward your place in the expanded post-war world trade. Write us, today!

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CHICAGO 9 · INDIANAPOLIS 6 · PHILADELPHIA 40 · DALLAS 1
ATLANTA · MINNEAPOLIS 5 · SAN FRANCISCO 24 · TORONTO 8

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9327-A

Chicago Plants · Indianapolis Plant · Ordnance Plant

"THE BACKBONE OF MASS PRODUCTION"

LINK-BELT

CONVEYORS...TRANSMISSION and SAND PREPARATION EQUIPMENT